Thu. Sep 14, 2023

Oral presentation | R1: Characterization and description of minerals (Joint Session with The Gemmological Society of Japan)

1:30 PM - 4:30 PM JST | 4:30 AM - 7:30 AM UTC | 820 Sugimoto Campus

R1: Characterization and description of minerals (Joint Session with The Gemmological Society of Japan)

Chairperson:Hiroshi Kitawaki, Masanori Kurosawa, Yasuyuki Banno

1:30 PM - 1:45 PM JST | 4:30 AM - 4:45 AM UTC

[R1-01] Greenland Ruby and Montana Sapphire; Trace element analysis using LA-ICP-MS and Origin determination

*Kentaro EMORI[1], Hiroshi Kitawaki[1] (1. Central Gem Laboratory)

1:45 PM - 2:00 PM JST | 4:45 AM - 5:00 AM UTC

[R1-02] Comparing study of trace element chemistry of skarn hosted and serpentinite hosted demantoid, a variety of andradite garnet

*Ahmadjan ABDURIYIM[1,2] (1. Tokyo Gem Science LLC, 2. GSTV Gemological Laboratory)

2:00 PM - 2:15 PM JST | 5:00 AM - 5:15 AM UTC

[R1-03] Rare gem-quality blue-green and green-blue haüyne

*Zhenghao Zhao[1], Hiroshi Kitawaki[1], Makoto Okano[1], Kazuki Komatsu[2] (1. Central Gem Laboratory, 2. Sci. UTokyo)

2:15 PM - 2:30 PM JST | 5:15 AM - 5:30 AM UTC

[R1-04] The nomenclature and gem identification of unusual red “musgravite”

*Hiroshi KITAWAKI[1], Zhenghao Zhao[1], Kentaro Emori[1], Makoto Okano[1], Yuji Manaka[1], Satoshi Ebitsubo[1] (1. CGL)

2:30 PM - 2:45 PM JST | 5:30 AM - 5:45 AM UTC

[R1-05] Nno-inclusion in blue sapphire from Diego, Madagascar

*Akira MIYAKE[1], Seika oto[1], Yohei Igami[1], Jun Uzuhashi[2], Tadakatsu Ohkubo[2], Hiroshi Kitawaki[3], Kentaro Emori[3] (1. Kyoto Univ., 2. NIMS, 3. CGL)

2:45 PM - 3:00 PM JST | 5:45 AM - 6:00 AM UTC

[R1-06] HRSTEM observation of columbite supergroup from Hirukawa, Nakatsugawa, Gifu Prefecture, Japan

*Toshihiro KOGURE[1], Yasuyuki Banno[2], Taiga Okumura[1] (1. Univ. Tokyo, Sci, 2. AIST)

3:00 PM - 3:15 PM JST | 6:00 AM - 6:15 AM UTC

[R1-07] Determination of local symmetry within the iridescent garnet from Tenkawa by spatially-resolved electron diffractometry

*Yohei IGAMI[1], Akira Miyake[1] (1. Kyoto Univ. Sci)

3:15 PM - 3:30 PM JST | 6:15 AM - 6:30 AM UTC

[R1-08] Dumortierite and tourmaline from the Takumi Mine, Hyogo Prefecture, Japan

*Yohei SHIROSE[1], Rikako KAMISE[1], Katsuichi NISHIDA, Yoshiteru FUJIWARA (1. Ehime Univ. Sci.)

3:30 PM - 3:45 PM JST | 6:30 AM - 6:45 AM UTC

[1Lecture-101-11-9add] 休憩

3:45 PM - 4:00 PM JST | 6:45 AM - 7:00 AM UTC

[R1-09] **Minerals from Nagatare area, Fukuoka**

*Seiichiro UEHARA[1] (1. Kyushu Uni. Museum)

4:00 PM - 4:15 PM JST | 7:00 AM - 7:15 AM UTC

[R1-10] Occurrence and genesis of zeolites in gastropod fossils in Miocene sediments in Minamisoma, Fukushima, Japan.

[Presentation award entry]

*Atsushi Ishihara[1], Hiroaki Ohfuji[1] (1. Tohoku Univ. Sci.)

4:15 PM - 4:30 PM JST | 7:15 AM - 7:30 AM UTC

[R1-11] Origins and formation mechanisms of various organic minerals associated with hydrothermal silica veins

*Ryoji Tanaka[1,2], Yuki Inoue[3], Takashi Ishibashi[4], Akihito Hagiwara (1. Sagami Chemical Research Institute, 2. Tokai Univ., 3. Kyushu Univ., 4. Museum of Osaka Univ.)

[zoom] Zoom

Oral presentation | S2: Water Rock Interaction (Special Session)

2:00 PM - 4:30 PM JST | 5:00 AM - 7:30 AM UTC | 821 Sugimoto Campus

S2: Water Rock Interaction (Special Session)

Chairperson:Noriyoshi Tsuchiya

2:00 PM - 2:05 PM JST | 5:00 AM - 5:05 AM UTC

[1Lecture-201-09-1add] コンビーナ挨拶

2:05 PM - 2:20 PM JST | 5:05 AM - 5:20 AM UTC

[S2-01] Weathering process of Nabari gabbroic body, especially formation of kaolinite/smectite mixed layer mineral

*Shigeru OKUMURA[1] (1. Non)

2:20 PM - 2:35 PM JST | 5:20 AM - 5:35 AM UTC

[S2-02] Occurrence and mineralogy of smectite in petit-spot basalts from the Northwest Pacific

[Presentation award entry]

*Taro KIDO[1], Norikatsu AKIZAWA[2], Yohey SUZUKI[1] (1. Univ. Tokyo, Sci., 2. Univ. Tokyo, AORI)

2:35 PM - 2:50 PM JST | 5:35 AM - 5:50 AM UTC

[S2-03] Dissolution behavior of wollastonite, olivine and basalt with natural chelating agents: features and promotion effects

[Presentation award entry]

*Sena Kikuchi[1], Jiajie Wang[1], Noriyoshi Tsuchiya[1] (1. Tohoku Univ. Environmental sci.)

2:50 PM - 3:05 PM JST | 5:50 AM - 6:05 AM UTC

[S2-04] Two geochemical processes recorded in trace element and Sr-Nd isotopic compositions of the CM1A core samples from the Oman ophiolite

*Masako YOSHIKAWA[1], Tomoyuki Shibata[1], Ikuo Katayama[1], Asyraf Mohamed Aminuddin[2], Ryoko Senda[3], Tomoaki Morishita[2] (1. Hiroshima Univ., 2. Kanazawa Univ., 3. Kyushu Univ.)

3:05 PM - 3:20 PM JST | 6:05 AM - 6:20 AM UTC

[S2-05] Early stages of serpentinization in the mantle section of the Salahi mantle section in the northern Oman ophiolite

Yohki Yoshiba[1], *Eiichi TAKAZAWA[1,2], Toshio Nozaka[3] (1. Niigata Univ. Sci., 2. JAMSTEC, 3. Okayama Univ.Sci.)

3:20 PM - 3:30 PM JST | 6:20 AM - 6:30 AM UTC

[1Lecture-201-09-7add] 休憩

3:30 PM - 3:45 PM JST | 6:30 AM - 6:45 AM UTC

[S2-06] Timing of B-bearing fluid-rock interaction in a subduction zone: an example from the Sanbagawa metamorphic belt

[Presentation award entry]

*Masanori YOKOI[1], Tetsuo KAWAKAMI[1] (1. Kyoto Univ. Sci.)

3:45 PM - 4:00 PM JST | 6:45 AM - 7:00 AM UTC

[S2-07] Behavior of fluorine, relationship between mineralization and water-rock interaction: an example of the Jinmu-Mihara fluorite skarn deposit.

[Presentation award entry]

*Masahiro SUNADA[1], Yasushi Watanabe[1], Takuya Echigo[1], Shogo Aoki[1], Kotaro Seno[1] (1. Akita Univ. Ers.)

4:00 PM - 4:15 PM JST | 7:00 AM - 7:15 AM UTC

[S2-08] Differences in petrophysics of gabbroic rock in ocean drilling core samples from different regions

*Natsue ABE[1,2], Toshiya Fujiwara[1] (1. Japan Agency for Marine-Earth Science and Technology (JAMSTEC), 2. Kanazawa University)

4:15 PM - 4:30 PM JST | 7:15 AM - 7:30 AM UTC

[S2-09] Fluid induced mylonitization and faulting processes

*Jun-ichi ANDO[1,2], Dyuti Prakash Sakar[1,2], Hirotoshi Kotama[1], Kaushik Das[1,2], Gautam Ghosh[3,2], Naotaka Tomioka[4,2] (1. Hiroshima Univ., 2. Hiroshima Univ. HiPeR, 3. Presidency Univ., 4. JAMSTEC)

[zoom] Zoom

Oral presentation | R7: Petrology, Mineralogy and Economic geology (Joint Session with Society of Resource Geology)

2:45 PM - 4:30 PM JST | 5:45 AM - 7:30 AM UTC | 822 Sugimoto Campus

R7: Petrology, Mineralogy and Economic geology (Joint Session with Society of Resource Geology)

Chairperson:Norikatsu Akizawa(Atmosphere and Ocean Research Institute, University of Tokyo), Takuya Echigo(Akita University)

2:45 PM - 3:00 PM JST | 5:45 AM - 6:00 AM UTC

[R7-01] Decomposition of organic matter by hydrothermal alteration in epithermal Au deposit in Kitami area, Hokkaido, Japan

Misato Kuniba[1], *Takuya ECHIGO[1], Yasushi Watanabe[1] (1. Internat. Resour. Sci., Akita Univ.)

3:00 PM - 3:15 PM JST | 6:00 AM - 6:15 AM UTC

[R7-02] The coloration Factor of Pale Blue Sepiolite in amygdales in Higashimatsuura basalt from Kabeshima island, Saga Prefecture, SW Japan

[Presentation award entry]

*Satsuki Kio[1], Terumi Ezima[2], Yoshiaki Kon[3], Hikari Minamisawa[4], Masaomi Horita[4] (1. Shinshu Univ. Sci., 2. Shinshu Univ. Sci. , 3. GSJ, AIST, 4. Shinshu Univ. Eng.)

3:15 PM - 3:30 PM JST | 6:15 AM - 6:30 AM UTC

[R7-03] Formation process of chalcedony at subaqueous volcanism 1 Oku-Matsushima region, Japan

[Presentation award entry]

*Natsuko Sano[1], Tsuyoshi Miyamoto[2], Takahiro Kuribayashi[1], Toshiro Nagase[3] (1. Tohoku Univ. Sci., 2. Tohoku Univ. CNEAS, 3. Tohoku Univ. Museum)

3:30 PM - 3:45 PM JST | 6:30 AM - 6:45 AM UTC

[R7-04] XANES analysis of inclusions containing polycyclic aromatic hydrocarbons in Tahitian mantle xenolith

[Presentation award entry]

*Itaru Mitsukawa[1], Akira Miyake[1], Yohei Igami[1], Yoshio Takahashi[2], Shohei Yamashita[3], Takahiro Kawai[2], Tetsu Kogiso[1], Norikatsu Akizawa[2] (1. Kyoto Univ. Sci., 2. Univ. Tokyo, 3. KEK)

3:45 PM - 4:00 PM JST | 6:45 AM - 7:00 AM UTC

[R7-05] Re-investigation of garnet peridotite xenolith from Salt Lake Crater, Hawaii

*Norikatsu AKIZAWA[1], Akira Ishikawa[2], Ryo Fujita[2], Tomoaki Morishita[3], Akihiro Tamura[3], Takashi Sano[4] (1. Uni. Tokyo, AORI, 2. Tokyo Tech., School Sci., 3. Kanazawa Uni., College Sci. Eng., 4. Natl. Mus. Nat. Sci.)

4:00 PM - 4:15 PM JST | 7:00 AM - 7:15 AM UTC

[R7-06] The preliminary results of piston cylinder experiments to homogenize multiphase solid inclusions observed in high pressure granulites and garnet-bearing peridotite in the Bohemian Massif

*Kosuke NAEMURA[1], Rin Abe[1], Tetsu Kogiso[2] (1. Iwate Univ. Edu., 2. Kyoto Univ. Human Env.)

4:15 PM - 4:30 PM JST | 7:15 AM - 7:30 AM UTC

[R7-07] Application of photon-counting computed tomography to rocks/crystals containing heavy elements

Ayumi Ishiguro[1], Makoto Arimoto[1,3,4], Daichi Sato[1], Takahiro Tomoda[1], Shinsuke Terazawa[5], Satoshi Shiota[5], *Tomoaki MORISHITA[3,2] (1. Kanazawa Univ. Nat. Sci., 2. JAMSTEC, 3. Kanazawa Univ. Sci.Engineer., 4. Waseda Univ. Sci. Engineer. , 5. Proterial Ltd.)

[zoom] Zoom

Fri. Sep 15, 2023

Oral presentation | R2: Crystal structure, crystal chemistry, physical properties of minerals, crystal growth and applied mineralogy

9:00 AM - 12:00 PM JST | 12:00 AM - 3:00 AM UTC | 820 Sugimoto Campus

R2: Crystal structure, crystal chemistry, physical properties of minerals, crystal growth and applied mineralogy

Chairperson:Kazuki 小松 Komatsu, Ryo Yamane(Tohoku Univ.), Mariko Nagashima

9:00 AM - 9:15 AM JST | 12:00 AM - 12:15 AM UTC

[R2-01] Prediction of low-temperature and high-pressure phase transition in keatite (SiO_2)

*Masami KANZAKI[1] (1. Okayama Univ.)

9:15 AM - 9:30 AM JST | 12:15 AM - 12:30 AM UTC

[R2-02] Deformation mechanism of layered silicate minerals by repplocations

*Hiroshi SAKUMA[1], Shigeru Suehara[1], Kenji Tamura[1] (1. National Institute for Materials Science)

9:30 AM - 9:45 AM JST | 12:30 AM - 12:45 AM UTC

[R2-03] Revisiting the mechamism of mixed alkali effect in silicate glass/liquid

*Fumiya NORITAKE[1], Soichiro Naito[1] (1. University of Yamanashi)

9:45 AM - 10:00 AM JST | 12:45 AM - 1:00 AM UTC

[R2-04] Structural variability and stability of FBUs in borate minerals

Nishiyasu Wataru[1], *Atsushi KYONO[1] (1. University of Tsukuba)

10:00 AM - 10:15 AM JST | 1:00 AM - 1:15 AM UTC

[R2-05] Determination of the crystal structure of Earth's constituent materials using in-house single-crystal X-ray diffraction measurements

[Presentation award entry]

*Shuhou MAITANI[1], Ryosuke Sinmyo[1], Takayuki Ishii[2], Kenji Yoza[3] (1. Meiji University, 2. Institute for Planetary Materials, Okayama University, 3. Bruker Japan)

10:15 AM - 10:30 AM JST | 1:15 AM - 1:30 AM UTC

[2Lecture-101-11-6add] 休憩

10:30 AM - 10:45 AM JST | 1:30 AM - 1:45 AM UTC

[R2-06] Calorimetric study of cation disordering in $MgAl_2O_4$ spinel

*Hiroshi KOJITANI[1], Ryuji MATSUKI[1], Itaru OHIRA[1] (1. Gakushuin Univ. Sci.)

10:45 AM - 11:00 AM JST | 1:45 AM - 2:00 AM UTC

[R2-07] NMR study on Al local structures in Al-bearing $CaTiO_3$ perovsskite

*Takaya NAGAI[1], Xianyu XUE[2] (1. Hokkaido Univ. Sci., 2. Okayama Univ. IPM)

11:00 AM - 11:15 AM JST | 2:00 AM - 2:15 AM UTC

[R2-08] Crystal structure of vaterite proposed by ABF/ADF-STEM

*Taiga OKUMURA[1], Gen TAKAHASHI[1], Toshihiro KOGURE[1] (1. UTokyo Sci.)

11:15 AM - 11:30 AM JST | 2:15 AM - 2:30 AM UTC

[R2-09] Effect of solution pH at synthesis on the crystallization behavior of amorphous calcium carbonate

*Chiho Morita[1], Kensuke Muraoka[1], Hiroki Kobayashi[1], Hiroyuki Kagi[1] (1. Tokyo Univ. Sci.)

11:30 AM - 11:45 AM JST | 2:30 AM - 2:45 AM UTC

[R2-10] Ordered Distribution of Ag and Cu in cosalite studied by Anomalous X-ray Scattering

*Ryo YAMANE[1], Takashi Mikouchi[2], Kunihisa Sugimoto[3], Toru Ozawa[4], Kazumasa Sugiyama[1] (1. Tohoku Univ. IMR, 2. Univ. of Tokyo UMUT, 3. KINDAI Univ., 4. Univ. of Tokyo Sci.)

11:45 AM - 12:00 PM JST | 2:45 AM - 3:00 AM UTC

[R2-11] Syntheses and single crystal structure analyses of Ir_2S_3 kashinite and Rh_2S_3 bowieite

*Akira YOSHIASA[1], Makoto Tokuda[1], Ginga Kitahara[1], Satoko Ishimaru[1], Akihiko Nakatsuka[2], Kazumasa Sugiyama[3]
(1. Kumamoto University, 2. Yamaguchi University, 3. Tohoku University)

[zoom] Zoom

Oral presentation | R8: Metamorphic rocks and tectonics

9:00 AM - 12:00 PM JST | 12:00 AM - 3:00 AM UTC | 821 Sugimoto Campus

R8: Metamorphic rocks and tectonics

Chairperson:Shunsuke Endo, Fumiko Higashino

9:00 AM - 9:15 AM JST | 12:00 AM - 12:15 AM UTC

[R8-01] Trace elements and strontium isotope geochemistry of phengite in pelitic schists from the Sambagawa Belt, central Shikoku

[Presentation award entry]

*Hironobu Harada[1], Tatsuki Tsujimori[1], Maureen Feineman[2], Kazumasa Aoki[3], Tetsumaru Itaya[4] (1. Tohoku Univ., 2. Penn State, 3. Okayama Univ. Sci., 4. jGnet)

9:15 AM - 9:30 AM JST | 12:15 AM - 12:30 AM UTC

[R8-02] Methane-bearing olivine-hosted fluid inclusions in a contact metamorphosed dolomitic marble from the Miyako area, Kitakami Mountains

*Hironobu Harada[1], Tatsuki Tsujimori[1] (1. Tohoku Univ.)

9:30 AM - 9:45 AM JST | 12:30 AM - 12:45 AM UTC

[R8-03] **Amphibolite-Granulite facies metamorphism at the base of island arcs: Clues from Calaton Hill, Tablas island, Philippines**

*Gabriel Theophilus V. VALERA[1], Andrew Exequiel S. Tabilog[1], John Kenneth B. Badillo[1], Betchaida D. Payot[1] (1. Univ. of the Philippines)

9:45 AM - 10:00 AM JST | 12:45 AM - 1:00 AM UTC

[R8-04] **Brittle fracturing during the closure of the Maizuru back-arc basin**

*Larissa NGOMBI MAVOUNGOU[1], Kaushik DAS[1,2], Dyuti Prakash SARKAR[1,2], Jun-ichi ANDO[1,2], Yasutaka HAYASAKA[1,2] (1. Hiroshima Univ., 2. HiPeR, Hiroshima)

10:00 AM - 10:15 AM JST | 1:00 AM - 1:15 AM UTC

[R8-05] **Elucidation of slip characteristics in shallow crustal faults from deformation experiments on sandstone gouges within Himalayan Main Frontal Thrust**

*Dyuti Prakash SARKAR[1,2], Takehiro Hirose[2,3] (1. Hiroshima University, 2. HiPeR, 3. KCC JAMSTEC)

10:15 AM - 10:30 AM JST | 1:15 AM - 1:30 AM UTC

[R8-06] Handling of the data obtained by quartz Raman barometry

*Yui KOUKETSU[1] (1. Nagoya Univ. Env.)

10:30 AM - 10:45 AM JST | 1:30 AM - 1:45 AM UTC

[2Lecture-201-11-7add] 休憩

10:45 AM - 11:00 AM JST | 1:45 AM - 2:00 AM UTC

[R8-07] Metagabbro from the Sanbagawa belt in western Shikoku, and its roles in deep underplating of subducting oceanic crust

*Shunsuke ENDO[1], Nachi Kurihara[1], Tomoki Taguchi[2] (1. Shimane University, 2. Waseda University)

11:00 AM - 11:15 AM JST | 2:00 AM - 2:15 AM UTC

[R8-08] **An approach to understand the mode of formation of titanite microtube texture in Tumbiana formation stromatolite, Pilbara Craton, western Australia**

*Kiran SASIDHARAN[1], Yoshihiro Nakamura[2], Satish-Kumar Madhusoodhan[1], Ohfuji Hiroaki[3] (1. Niigata University, 2. Geological Survey of Japan, AIST, 3. Tohoku University)

11:15 AM - 11:30 AM JST | 2:15 AM - 2:30 AM UTC

[R8-09] Morphology and residual elastic stress of coesite within kayanite from the UHP whiteschist of the Southern Dora-Maira Massif

*Nami Takeda[1], Tatsuki Tsujimori[1,2], Tatsuhiko Kawamoto[3], Tetsumaru Itaya[4] (1. Tohoku Univ. Sci, 2. Tohoku Univ. CNEAS, 3. Shizuoka Univ. Sci, 4. jGnet)

11:30 AM - 11:45 AM JST | 2:30 AM - 2:45 AM UTC

[R8-10] On the evaluation of the phengite K-Ar age of the Lawsonite blueschist: Examples from the Horokanai area in the Kamuikotan Belt and the Hakoishi-unit in the Kurosegawa Belt.

*Takao HIRAJIMA[1], Kosuke Naemura[2] (1. Kyoto University, 2. Iwate University)

11:45 AM - 12:00 PM JST | 2:45 AM - 3:00 AM UTC

[R8-11] Precipitation of graphite in continental crust from CO_2-rich fluids: Evidence from fluid inclusions, Raman spectroscopy and carbon stable isotopes

*Madhusoodhan SATISH-KUMAR[1], Sasidharan KIRAN[1], Kana UMETSU[1], Sanjeewa MALAVIARACHCHI[2] (1. Niigata University, 2. University of Peradeniya)

[zoom] Zoom

Oral presentation | R4: Mineral sciences of the Earth surface

9:00 AM - 11:30 AM JST | 12:00 AM - 2:30 AM UTC | 822 Sugimoto Campus

R4: Mineral sciences of the Earth surface

Chairperson:Satoshi Utsunomiya(Kyushu University), Tadashi Yokoyama(Hiroshima University), Jun Kawano(Hokkaido University)

9:00 AM - 9:15 AM JST | 12:00 AM - 12:15 AM UTC

[R4-01] Borehole core analysis of Hiroshima Granite: Depth variation of permeability and porosity and implications for weathering rates

*Tadashi YOKOYAMA[1], Atsuki Yoshida[3], Masahiro Kaibori[2], Ikuo Katayama[1], Kazumasa Tanimoto[1] (1. Hiroshima Univ. Adv. Sci. Eng., 2. Hiroshima Univ. Resilience Research Center, 3. Kyoto Univ.)

9:15 AM - 9:30 AM JST | 12:15 AM - 12:30 AM UTC

[R4-02] Hematite-Goethite Problem on Mars: Transformation of Ferrihydrite to Crystalline Fe Oxides in Salt Solutions

*So Fukaya[1], Keisuke Fukushi[2], Yoshio Takahashi[3] (1. Kanazawa Univ. Sci., 2. Kanazawa Univ., 3. The University of Tokyo)

9:30 AM - 9:45 AM JST | 12:30 AM - 12:45 AM UTC

[R4-03] Band structure of Fe oxides in the Earth surface

*Sayako INOUE[1], Naoki Tarutani[2] (1. Ehime Univ. GRC, 2. Hiroshima Univ. Adv. Sci. Eng,)

9:45 AM - 10:00 AM JST | 12:45 AM - 1:00 AM UTC

[R4-04] Measurement of Exchange Selectivity Coefficients of Interlayer Cations in Smectites and their Raman Spectroscopic Characterization

*Yohei NOJI[1], Keisuke Fukushi[2], yuichiro Cho[3,2], HaHaruhisa Tabata[3] (1. Kanazawa Univ. Sci., 2. Kanazawa Univ., 3. Tokyo Univ.)

10:00 AM - 10:15 AM JST | 1:00 AM - 1:15 AM UTC

[2Lecture-301-09-5add] 休憩

10:15 AM - 10:30 AM JST | 1:15 AM - 1:30 AM UTC

[R4-05] Analysis of the formation process of calcium carbonate polymorphs in gels with the pH visualization technique

Matsumoto Shinji[1], *Jun KAWANO[1], Kousei Miki[1], Takashi Toyofuku[2], Yukiko Nagai[2], Takaya Nagai[1] (1. Hokkaido Univ. Sci., 2. JAMSTEC)

10:30 AM - 10:45 AM JST | 1:30 AM - 1:45 AM UTC

[R4-06] Unique structures and chemical compositions found around the center of fish otoliths

[Presentation award entry]

*Gen Takahashi[1], Taiga Okumura[1], Michio Suzuki [2], Toshihiro Kogure[1] (1. Univ. Tokyo Sci., 2. Univ. Tokyo Agri.)

10:45 AM - 11:00 AM JST | 1:45 AM - 2:00 AM UTC

[R4-07] The color change materials and cause of the coloring of the microbial mats on the surface of the calcareous sinter and the color change materials
~Mineral crystallization and oxidation in microbial mats~

*Miki Suzuki[1], Miku Tatuiwa[2], Terumi Ejima[3], Haruki Yamazaki[4], Hikari Minamisawa[5], Masaomi Horita[5], Maki Hamada[6] (1. Shinshu Univ. Sci., 2. Shinshu Univ. Sci., 3. Shinshu Univ. Sci., GSJ, AIST, 4. Shinshu Univ. Sci., GSJ, AIST, 5. Shinshu Univ. Eng., 6. Kanazawa Univ.)

11:00 AM - 11:15 AM JST | 2:00 AM - 2:15 AM UTC

[R4-08] U(VI) uptake during transformation of monohydrocalcite

*Yumi Morita[1], Keisuke Fukushi[2], Yoshio Takahashi[3] (1. Kanazawa Univ. Sci, 2. Kanazawa Univ., 3. The University of Tokyo)

11:15 AM - 11:30 AM JST | 2:15 AM - 2:30 AM UTC

[R4-09] **Volatilization of B_4C control rods in Fukushima Daiichi nuclear reactors during meltdown: B–Li isotopic signatures in cesium-rich microparticles**

Kazuki Fueda[1], Toshihiko Ohnuki[7], Shinya Yamasaki[2], Kenji Horie[3], Mami Takehara[3], Gareth Law[6], Bernd Grambow[5], Rodney C. Ewing[4], *Satoshi UTSUNOMIYA[1] (1. Kyushu University, 2. Tsukuba Univ., 3. NIPR, 4. Stanford Univ., 5. Univ. Nantes, 6. Univ. Helsinki, 7. TITECH)

[zoom] Zoom

Sat. Sep 16, 2023

Oral presentation | S1: Dynamics of igneous processes (Special Session)

9:00 AM - 10:00 AM JST | 12:00 AM - 1:00 AM UTC | 820 Sugimoto Campus

S1: Dynamics of igneous processes (Special Session)

Chairperson:Morihisa Hamada(JAMSTEC), Shumpei Yoshimura(Hokkaido University)

9:00 AM - 9:15 AM JST | 12:00 AM - 12:15 AM UTC

[S1-01] Dehydration and heating processes during magma transportation decoded from chemical zonings in peridotite xenolith from Ichinomegata, NE Japan

*Yuto SATO[1], Eiichi Takahashi[1], Kazuhito Ozawa[2] (1. GIGCAS, 2. AORI, Univ. Tokyo)

9:15 AM - 9:30 AM JST | 12:15 AM - 12:30 AM UTC

[S1-02] **Post-entrapment density modification of fluid inclusions by elastic deformation: Implications for fluid inclusion geobarometry of peridotites**

*Yuuki HAGIWARA[1], Ross John Angel[2], Junji Yamamoto[3], Rosario Esposito[4], Matteo Alvaro[5] (1. JAMSTEC, 2. IGG-CNR, 3. Kyushu University, 4. University of Milano-Bicocca, 5. University of Pavia)

9:30 AM - 9:45 AM JST | 12:30 AM - 12:45 AM UTC

[S1-03] Textural and chemical changes of alkali feldspar during disequilibrium melting of granite

*Hiroshi KAWABATA[1], Shigeru YAMASHITA[2] (1. Kochi University, 2. Okayama University)

9:45 AM - 10:00 AM JST | 12:45 AM - 1:00 AM UTC

[S1-04] Experimental simulation of crystallite and spherulite in rhyolitic lava

*Tamotsu Sugawara[1], Shumpei Yoshimura[1] (1. Hokkaido Univ. Sci.)

[zoom] Zoom

Oral presentation | R5: Extraterrestrial materials

9:00 AM - 12:00 PM JST | 12:00 AM - 3:00 AM UTC | 821 Sugimoto Campus

R5: Extraterrestrial materials

Chairperson:Megumi Matsumoto, Daiki Yamamoto, Yusuke Seto, Shogo Tahibana

9:00 AM - 9:15 AM JST | 12:00 AM - 12:15 AM UTC

[R5-01] Shock deformation microstructures in rutile

*Yuhei Umeda[1], Yuma Nagai[1], Naotaka Tomioka[2], Toshimori Sekine[3], Masashi Miyakawa[4], Takamichi Kobayashi[4], Hitoshi Yusa[4], Takuo Okuchi[1] (1. Kyoto Univ. KURNS., 2. JAMSTEC, 3. HPSTAR, 4. NIMS)

9:15 AM - 9:30 AM JST | 12:15 AM - 12:30 AM UTC

[R5-02] Microstructures of calcite deformed by 3-D shock experiments

*Naotaka TOMIOKA[1], Kosuke Kurosawa[2], Haruka Ono[3], Takafumi Niihara[4], Takafumi Matsui[2] (1. KOCHI, JAMSTEC, 2. PERC, Chiba Inst. Tech., 3. Res. Org. Sci. Tech., Ritsumeikan Univ., 4. Dept App. Sci., Okayama Sci. Univ.)

9:30 AM - 9:45 AM JST | 12:30 AM - 12:45 AM UTC

[R5-03] FIB-TEM observation of silica minerals coexisting in achondrites

*Atsushi TAKENOUCHI[1], Youhei Igami[2], Akira Miyake[2], Haruka Ono[3], Takashi Mikouchi[4], Akira Yamaguchi[5] (1. The Kyoto Univ. Museum, 2. Kyoto Univ., 3. Ritsumeikan Univ., 4. The Univ. Museum, The Univ. of Tokyo, 5. Natl. Inst. of Polar Res.)

9:45 AM - 10:00 AM JST | 12:45 AM - 1:00 AM UTC

[R5-04] Assessment of Shock Melting of Martian Meteorites as Deduced from Short Time Heating Experiments of Basalt and Martian Soil Simulants

[Presentation award entry]

*Takeru Sato[1], Takashi Mikouchi[2] (1. Univ. of Tokyo, 2. Univ. of Tokyo)

10:00 AM - 10:15 AM JST | 1:00 AM - 1:15 AM UTC

[R5-05] Observation of internal structure of diamond in carbon grains in DaG 999 ureilite.

*Masahiro YASUTAKE[1], Megumi Matsumoto[3], Junya Matsuno[2], Akira Tsuchiyama[2,4], Kentaro Uesugi[1], Akihisa Takeuchi[1] (1. JASRI, 2. Ritsumeikan Univ., 3. Tohoku Univ., 4. CAS/GIG)

10:15 AM - 10:30 AM JST | 1:15 AM - 1:30 AM UTC

[3Lecture-201-11-6add] 休憩

10:45 AM - 11:00 AM JST | 1:45 AM - 2:00 AM UTC

[R5-07] Nano-CT and TEM analysis of impact melt splashes and microcraters on asteroid Ryugu samples

*Megumi MATSUMOTO[1], Junya Matsuno[2], Akira Tsuchiyama[2,3], Tomoki Nakamura[1], Yuma Enokido[1], Mizuha Kikuiri[1], Masahiro Yasutake[4], Kentaro Uesugi[4], Akihisa Takeuchi[4], Satomi Enju[5], Shota Okumura[6], Itaru Mitsukawa[6], Sun Mingqi[3], Akira Miyake[6], Hayabusa2 initial analysis core-team (1. Tohoku Univ., 2. Ritsumeikan Univ., 3. GIG, CAS, 4. JASRI, 5. Ehime Univ., 6. Kyoto Univ.)

11:00 AM - 11:15 AM JST | 2:00 AM - 2:15 AM UTC

[R5-08] Origins of olivine grains in CI chondrites and asteroid Ryugu samples as inferred from their major and minor element compositions

*Takashi MIKOUCHI[1], Hideto Yoshida[1], Minami Masuda[1], Michael E. Zolensky[2] (1. Univ. of Tokyo, 2. NASA/JSC)

11:15 AM - 11:30 AM JST | 2:15 AM - 2:30 AM UTC

[R5-09] On the relationship between modal abundances of minerals and degrees of aqueous alteration of the brecciated fragments in the Orgueil CI chondrite

*Minami Masuda[1], Takashi Mikouchi[2], Michael Zolensky[3] (1. UTokyo Sci., 2. UTokyo UMUT/Sci., 3. NASA JSC)

11:30 AM - 11:45 AM JST | 2:30 AM - 2:45 AM UTC

[R5-10] Mineralogical diversity of the C1 lithologies in the Kaidun meteorite

[Presentation award entry]

*Kenei OGIYA[1], Takashi Mikouchi[2], Michael E Zolensky[3] (1. Univ. of Tokyo, 2. Univ. of Tokyo , 3. NASA)

11:45 AM - 12:00 PM JST | 2:45 AM - 3:00 AM UTC

[R5-11] Classification of subtype 3.0 chondrites

*Makoto Kimura[1], Michale K. Weisberg[2], Akira Yamaguchi[1] (1. National Institute of Polar Rsearch, 2. City University of New York)

[zoom] Zoom

Oral presentation | R3: High-pressure science and deep Earth's material

9:00 AM - 12:00 PM JST | 12:00 AM - 3:00 AM UTC | 822 Sugimoto Campus

R3: High-pressure science and deep Earth's material

Chairperson:Takaaki Kawazoe(Hiroshima University), Takeshi Sakai(Ehime University), Masayuki Nishi(Osaka University)

9:00 AM - 9:15 AM JST | 12:00 AM - 12:15 AM UTC

[R3-01] First-principles investigations of the polysomatism of antigorite under pressure

*Jun TSUCHIYA[1], Sayako Inoue[1], Taiga Mizoguchi[1] (1. Ehime University)

9:15 AM - 9:30 AM JST | 12:15 AM - 12:30 AM UTC

[R3-02] The change in the hydrous mechanism of enstatite with Al incorporation

*Moe Sakurai[1], Hiroshi Sakuma[2], Noriyoshi Tsujino[3], Eiichi Takahashi[4], Katsuyuki Kawamura[5] (1. Okayama Univ., 2. NIMS, 3. JASRI, 4. GIG, CAS, 5. Tokyo Tech.)

9:30 AM - 9:45 AM JST | 12:30 AM - 12:45 AM UTC

[R3-03] H and Al incorporation mechanisms in stishovite: New insights from multi-nuclear NMR and first-principles calculation

*Xianyu XUE[1], Masami Kanzaki[1] (1. Okayama University)

9:45 AM - 10:00 AM JST | 12:45 AM - 1:00 AM UTC

[R3-04] Influence of high oxygen fugacity on melting temperature of wadsleyite and chemical composition of the generated melts

[Presentation award entry]

*Kazutaka YAMAGUCHI[1], Takaaki Kawazoe[1], Toru Inoue[1], Takeshi Sakai[2] (1. Hiroshima Univ. Adv, 2. Ehime Univ. Geodynamics)

10:00 AM - 10:15 AM JST | 1:00 AM - 1:15 AM UTC

[R3-05] Anoisotropic electrical resistivity in $FeTiO_3$ ilmenite, compressibility and spin state under high pressure.

*Takamitsu YAMANAKA[1] (1. Chinese HPSTAR)

10:15 AM - 10:30 AM JST | 1:15 AM - 1:30 AM UTC

[R3-06] Melting relations at the mantle transition zone to uppermost lower mantle in the MgO-SiO_2-H_2O system

*Toru INOUE[1], Kota OKUMURA[1], Takaaki KAWAZOE[1], Sho KAKIZAWA[2], Masamichi NODA[3], Tetsuo IRIFUNE[4], Toru SHINMEI[4] (1. Hiroshima Univ.y, 2. JASRI, 3. Delaware State Univ., 4. Ehime Univ. GRC)

10:30 AM - 10:45 AM JST | 1:30 AM - 1:45 AM UTC

[3Lecture-301-11-7add] 休憩

10:45 AM - 11:00 AM JST | 1:45 AM - 2:00 AM UTC

[R3-07] **Water content profile of magma in the mantle transition zone predicted from high-pressure, high-temperature experiments**

[Presentation award entry]

*Yusuke Egi[1], Toru Inoue[1], Kota Okumura[1], Takaaki Kawazoe[1] (1. Hiroshima Univ. Sci.)

11:00 AM - 11:15 AM JST | 2:00 AM - 2:15 AM UTC

[R3-08] Elastic anomaly at the spin transition in ferropericlase: Revisited by GHz-DAC Ultrasonic Velocity Measurement newly developed

*Takuto Kato[1], Akira Yoneda[1], Tadashi Kondo[1], Daisuke Yamazaki[2] (1. Osaka Univ. Sci., 2. Okayama. IPM)

11:15 AM - 11:30 AM JST | 2:15 AM - 2:30 AM UTC

[R3-09] Iron-Water Exchange at the Earth's Core-Mantle Boundary

[Presentation award entry]

*Katsutoshi Kawano[1], Masayuki Nishi[1], Sho Kakizawa[2], Toru Inoue[3], Hideharu Kuwahara[4], Tadashi Kondo[1] (1. Osaka Univ. Sci, 2. JASRI, 3. Hiroshima Univ. Sci, 4. Ehime Univ. GRC)

11:30 AM - 11:45 AM JST | 2:30 AM - 2:45 AM UTC

[R3-10] Increase of hydrogen-induced volume expansion by incorporation of Si into iron and the effect in estimated hydrogen content in the Earth's core

[Presentation award entry]

*Yuichiro MORI[1], Hiroyuki Kagi[1], Katsutoshi Aoki[1], Masahiro Takano[1], Sho Kakizawa[2], Asami Sano[3], Ken-ichi Funakshi[4] (1. UTokyo, 2. JASRI, 3. J-PARC Center, JAEA, 4. CROSS)

11:45 AM - 12:00 PM JST | 2:45 AM - 3:00 AM UTC

[R3-11] Post-spinel transition of Fe_2SiO_4 ahrensite at high pressure and high temperature

*Masaki AKAOGI[1,2], Natsuki MIYAZAKI[1], Taisuke TAJIMA[1], Hiroshi KOJITANI[1] (1. Gakushuin Univ. Sci. , 2. Univ. Tokyo Sci.)

[zoom] Zoom

Oral presentation | R6: Plutonic rocks, volcanic rocks and subduction factory

10:15 AM - 12:00 PM JST | 1:15 AM - 3:00 AM UTC | 820 Sugimoto Campus

R6: Plutonic rocks, volcanic rocks and subduction factory

Chairperson:Takashi Yuguchi, Atsushi Kamei

10:15 AM - 10:30 AM JST | 1:15 AM - 1:30 AM UTC

[R6-01] Igneous activity formed meta-granitoid in the Tenmondai rocks of the Lützow-Holm complex, East Antarctica

*Atsushi KAMEI[1], Momo Ichikawa[1], Tomokazu Hokada[2], Kenichiro Tani[3], Ippei Kitano[4], Sotaro Baba[5], Nugroho I. Setiawan[6], Prayath Nantasin[7], Davaa-ochir Dashbaatar[8], Yoichi Motoyoshi[2] (1. Shimane University, 2. National Institute of Polar Research, 3. National Museum of Nature and Science, 4. Hokkaido University, 5. University of the Ryukyus, 6. Universitas Gadjah Mada, 7. Kasetsart University, 8. Mongolian University of Science and Technology)

10:30 AM - 10:45 AM JST | 1:30 AM - 1:45 AM UTC

[R6-02] Mafic veins in the mantle section recovered during Oman Drilling Project: products of backarc spreading?

*Yuji ICHIYAMA[1], Hisatoshi Ito[2], Akihiro Tamura[3], Tomoaki Morishita[3] (1. Chiba University, 2. Central Research Institute of ElectricPower Industry, 3. Kanazawa University)

10:45 AM - 11:00 AM JST | 1:45 AM - 2:00 AM UTC

[R6-03] Muographic study of the oceanic crust-mantle density structure of the Oman Ophiolite

*Susumu UMINO[1], Hiroyuki Tanaka[2], László Oláh[2], Dezső Varga[4], Tomoaki Morishita[1], Yoshihiro Hiramatsu[1], Yuki Kusano[3] (1. Kanazawa University, 2. University of Tokyo, 3. AIST, 4. Wigner Research Center for Physics)

11:00 AM - 11:15 AM JST | 2:00 AM - 2:15 AM UTC

[R6-04] Magma genesis of the Iwafune diorites, Ibaraki Prefecture

[Presentation award entry]

*Haruki YAMAZAKI[1,2], Terumi EJIMA[1,2], Yoshiaki KON[2] (1. Shinshu Univ. Sci., 2. GSJ, AIST)

11:15 AM - 11:30 AM JST | 2:15 AM - 2:30 AM UTC

[R6-05] Zircon U-Pb age combined with trace element geochemistry constraining the source of Miocene granitoids of the Kagoshima Prefecture, Japan

*Hafiz Ur REHMAN[1], Marimo NAKABAYASHI[1], Yuki OTA[1], Kaushik DAS[2], Chung Sun LIN[3], Hao YANG LEE[3], Daisuke YAMASHITA[4], Hiroshi YAMAMOTO[1] (1. Kagoshima Uni., 2. Hiroshima Uni., 3. IES, Academia Sinica, Taiwan, 4. Satsumasendai Kosh. Mus.)

11:30 AM - 11:45 AM JST | 2:30 AM - 2:45 AM UTC

[R6-06] Chronological re-examination of the Kanmon Group, Southwest Japan: and remaining unsolved problems

*Yukiyasu TSUTSUMI[1], Ryo Hasegawa[2], Yukio Isozaki[3] (1. National Museum of Nature and Science, 2. FUJIFILM Business Innovation Corp., 3. Graduate school of Arts and Sciences, University of Tokyo)

11:45 AM - 12:00 PM JST | 2:45 AM - 3:00 AM UTC

[R6-07] U-Pb zircon age of granitoids in the Aoyama area, Ryoke belt, SW Japan

*Fumiko HIGASHINO[1], Tetsuo KAWAKAMI[1], Shuhei SAKATA[2], Shunpei Kudo[1], Yohei IGAMI[1] (1. Kyoto Univ. Sci., 2. Univ. Tokyo)

[zoom] Zoom

Oral presentation | R5: Extraterrestrial materials

2:00 PM - 3:00 PM JST | 5:00 AM - 6:00 AM UTC | 821 Sugimoto Campus

R5: Extraterrestrial materials

Chairperson:Megumi Matsumoto, Daiki Yamamoto, Yusuke Seto, Shogo Tahibana

2:00 PM - 2:15 PM JST | 5:00 AM - 5:15 AM UTC

[R5-12] Chemical Composition of Circumstellar Amorphous Silicate Dust: Condensation Experiments in the Na-Mg-Al-Si-Ca-Fe-Ni-O System

*Hanako Enomoto[1], Aki Takigawa[1] (1. UTokyo)

2:15 PM - 2:30 PM JST | 5:15 AM - 5:30 AM UTC

[R5-13] Survivability of presolar SiC grains in the protosolar disk: An experimental study

*Daiki YAMAMOTO[1], Aki TAKIGAWA[2], Shogo TACHIBANA[2] (1. Kyushu University, 2. University of Tokyo)

2:30 PM - 2:45 PM JST | 5:30 AM - 5:45 AM UTC

[R5-14] Antarctic micrometeorites containing pseudomorphs of melanophlogite: Dust from the sub-surface ocean of icy satellites or from an unknown type of trans-Neptunian objects?

*Takaaki NOGUCHI[1], Takuya Mitsunari[2,3], Rikako Matsumoto[4,5], Akira Yamaguchi[6], Naoya Imae[6], Toru Matsumoto[1], Toru Araki[7], Hayato Yuzawa[7], Akira Miyake[1] (1. Kyoto Univ. Sci., 2. Ibaraki Univ. Sci., 3. Mitsubishi Elect. Soft. Co., 4. Kyushu Univ. Sci., 5. Ine T.H., 6. NIPR, 7. IMS)

2:45 PM - 3:00 PM JST | 5:45 AM - 6:00 AM UTC

[R5-15] **Studies of Earth's minerals and rocky mixtures beyond Earth**

*Yasunori MIURA[1] (1. Post Yamaguchi Univ. Sci.)

[zoom] Zoom

Oral presentation | R3: High-pressure science and deep Earth's material

2:00 PM - 3:00 PM JST | 5:00 AM - 6:00 AM UTC | 822 Sugimoto Campus

R3: High-pressure science and deep Earth's material

Chairperson:Takaaki Kawazoe(Hiroshima University), Takeshi Sakai(Ehime University), Masayuki Nishi(Osaka University)

2:00 PM - 2:15 PM JST | 5:00 AM - 5:15 AM UTC

[R3-12] High temperature formation of the oxygen-rich Martian core

*Eiji OHTANI[1], William F McDonough[1,2] (1. Tohoku University, 2. University of Maryland)

2:15 PM - 2:30 PM JST | 5:15 AM - 5:30 AM UTC

[R3-13] Microtexture evolution of pure aluminum severely deformed at static high pressures

*Takuo OKUCHI[1,2], Yuto TANAKA[2,1], Naotaka TOMIOKA[3], Tomokazu SANO[4], Tomoki MATSUDA[4], Kazuto ARAKAWA[5], Yusuke SETO[6] (1. Kyoto Univ. KURNS, 2. Kyoto Univ. Mech. Eng., 3. Kochi JAMSTEC, 4. Osaka Univ. Eng., 5. Shimane Univ. NEXTA, 6. Osaka Metropolitan Univ. Sci.)

2:30 PM - 2:45 PM JST | 5:30 AM - 5:45 AM UTC

[R3-14] **Quantitative chemical analysis of the fine textures of natural and synthetic materials using ATEM**

*Kiyoshi FUJINO[1], Naotaka TOMIOKA[2], Hiroaki OHFUJI[3] (1. Non, 2. JAMSTEC, 3. Tohoku Univ.)

2:45 PM - 3:00 PM JST | 5:45 AM - 6:00 AM UTC

[R3-15] Synthesis of polycrystalline diamond from glassy carbon by direct conversion at high pressure and temperature

Chinatsu Ogawa[1], *Tetsuo Irifune[1], Sayako Inoue[1], Takehiro Kunimoto[1], Toru Shinmei[1], Akimasa Suzumura[2], Shoichi Itoh[2] (1. Ehime University, 2. Kyoto University)

[zoom] Zoom

Oral presentation | R1: Characterization and description of minerals (Joint Session with The Gemmological Society of Japan)

Thu. Sep 14, 2023 1:30 PM - 4:30 PM JST | Thu. Sep 14, 2023 4:30 AM - 7:30 AM UTC | 820 Sugimoto Campus

R1: Characterization and description of minerals (Joint Session with The Gemmological Society of Japan)

Chairperson:Hiroshi Kitawaki, Masanori Kurosawa, Yasuyuki Banno

[座長]
北脇 裕士:R1-01～R1-03
黒澤 正紀:R1-04～R1-07
坂野 靖行:R1-08～R1-11

1:30 PM - 1:45 PM JST | 4:30 AM - 4:45 AM UTC

[R1-01] Greenland Ruby and Montana Sapphire; Trace element analysis using LA-ICP-MS and Origin determination

*Kentaro EMORI[1], Hiroshi Kitawaki[1] (1. Central Gem Laboratory)

1:45 PM - 2:00 PM JST | 4:45 AM - 5:00 AM UTC

[R1-02] Comparing study of trace element chemistry of skarn hosted and serpentinite hosted demantoid, a variety of andradite garnet

*Ahmadjan ABDURIYIM[1,2] (1. Tokyo Gem Science LLC, 2. GSTV Gemological Laboratory)

2:00 PM - 2:15 PM JST | 5:00 AM - 5:15 AM UTC

[R1-03] Rare gem-quality blue-green and green-blue haüyne

*Zhenghao Zhao[1], Hiroshi Kitawaki[1], Makoto Okano[1], Kazuki Komatsu[2] (1. Central Gem Laboratory, 2. Sci. UTokyo)

2:15 PM - 2:30 PM JST | 5:15 AM - 5:30 AM UTC

[R1-04] The nomenclature and gem identification of unusual red “musgravite”

*Hiroshi KITAWAKI[1], Zhenghao Zhao[1], Kentaro Emori[1], Makoto Okano[1], Yuji Manaka[1], Satoshi Ebitsubo[1] (1. CGL)

2:30 PM - 2:45 PM JST | 5:30 AM - 5:45 AM UTC

[R1-05] Nno-inclusion in blue sapphire from Diego, Madagascar

*Akira MIYAKE[1], Seika oto[1], Yohei Igami[1], Jun Uzuhashi[2], Tadakatsu Ohkubo[2], Hiroshi Kitawaki[3], Kentaro Emori[3] (1. Kyoto Univ., 2. NIMS, 3. CGL)

2:45 PM - 3:00 PM JST | 5:45 AM - 6:00 AM UTC

[R1-06] HRSTEM observation of columbite supergroup from Hirukawa, Nakatsugawa, Gifu Prefecture, Japan

*Toshihiro KOGURE[1], Yasuyuki Banno[2], Taiga Okumura[1] (1. Univ. Tokyo, Sci, 2. AIST)

3:00 PM - 3:15 PM JST | 6:00 AM - 6:15 AM UTC

[R1-07] Determination of local symmetry within the iridescent garnet from Tenkawa by spatially-resolved electron diffractometry

*Yohei IGAMI[1], Akira Miyake[1] (1. Kyoto Univ. Sci)

3:15 PM - 3:30 PM JST | 6:15 AM - 6:30 AM UTC

[R1-08] Dumortierite and tourmaline from the Takumi Mine, Hyogo Prefecture, Japan

*Yohei SHIROSE[1], Rikako KAMISE[1], Katsuichi NISHIDA, Yoshiteru FUJIWARA (1. Ehime Univ. Sci.)

3:30 PM - 3:45 PM JST | 6:30 AM - 6:45 AM UTC

[1Lecture-101-11-9add] 休憩

3:45 PM - 4:00 PM JST | 6:45 AM - 7:00 AM UTC

[R1-09] **Minerals from Nagatare area, Fukuoka**

*Seiichiro UEHARA[1] (1. Kyushu Uni. Museum)

4:00 PM - 4:15 PM JST | 7:00 AM - 7:15 AM UTC

[R1-10] Occurrence and genesis of zeolites in gastropod fossils in Miocene sediments in Minamisoma, Fukushima, Japan.

[Presentation award entry]

*Atsushi Ishihara[1], Hiroaki Ohfuji[1] (1. Tohoku Univ. Sci.)

4:15 PM - 4:30 PM JST | 7:15 AM - 7:30 AM UTC

[R1-11] Origins and formation mechanisms of various organic minerals associated with hydrothermal silica veins

*Ryoji Tanaka[1,2], Yuki Inoue[3], Takashi Ishibashi[4], Akihito Hagiwara (1. Sagami Chemical Research Institute, 2. Tokai Univ., 3. Kyushu Univ., 4. Museum of Osaka Univ.)

[zoom] Zoom

Greenland Ruby and Montana Sapphire; Trace element analysis using LA-ICP-MS and Origin determination

*Kentaro EMORI[1], Hiroshi Kitawaki[1]

1. Central Gem Laboratory

Keywords: Corundum, LA-ICP-MS, Greenland, Montana, Origin determination

Comparing study of trace element chemistry of skarn hosted and serpentinite hosted demantoid, a variety of andradite garnet

*Ahmadjan ABDURIYIM[1,2]

1. Tokyo Gem Science LLC, 2. GSTV Gemological Laboratory

Keywords: demantoid, skarn hosted and serpentinite hosted



Rare gem-quality blue-green and green-blue haüyne

*Zhenghao Zhao[1], Hiroshi Kitawaki[1], Makoto Okano[1], Kazuki Komatsu[2]

1. Central Gem Laboratory, 2. Sci. UTokyo

Keywords: Haüyne, Sodalite, Single Crystal X-Ray Diffraction, X-Ray Fluorescence, Spectroscopy



The nomenclature and gem identification of unusual red “musgravite”

*Hiroshi KITAWAKI[1], Zhenghao Zhao[1], Kentaro Emori[1], Makoto Okano[1], Yuji Manaka[1], Satoshi Ebitsubo[1]

1. CGL

Keywords: Musgravite, EDXRF, Raman spectrum, Infrared spectrum



Nno-inclusion in blue sapphire from Diego, Madagascar

*Akira MIYAKE[1], Seika oto[1], Yohei Igami[1], Jun Uzuhashi[2], Tadakatsu Ohkubo[2], Hiroshi Kitawaki[3], Kentaro Emori[3]

1. Kyoto Univ., 2. NIMS, 3. CGL

Nano-inclusions in Be-containing natural blue sapphires (corundum) from Diego, Madagascar were observed and analysed by transmission electron microscope (TEM) and 3D atomprobe (3DAP). TEM results show that Nano-inclusion has 20-40 nm length and 5-10 nm width, and the nano-inclusion is identified by srilankite, one kind of polymorphs of TiO_2. TEM and 3DAP results show the inclusion consists of Ti, Nb, Ta, Fe, Sn and Be component is found in the boundary between inclusion and matrix phase, corundum.

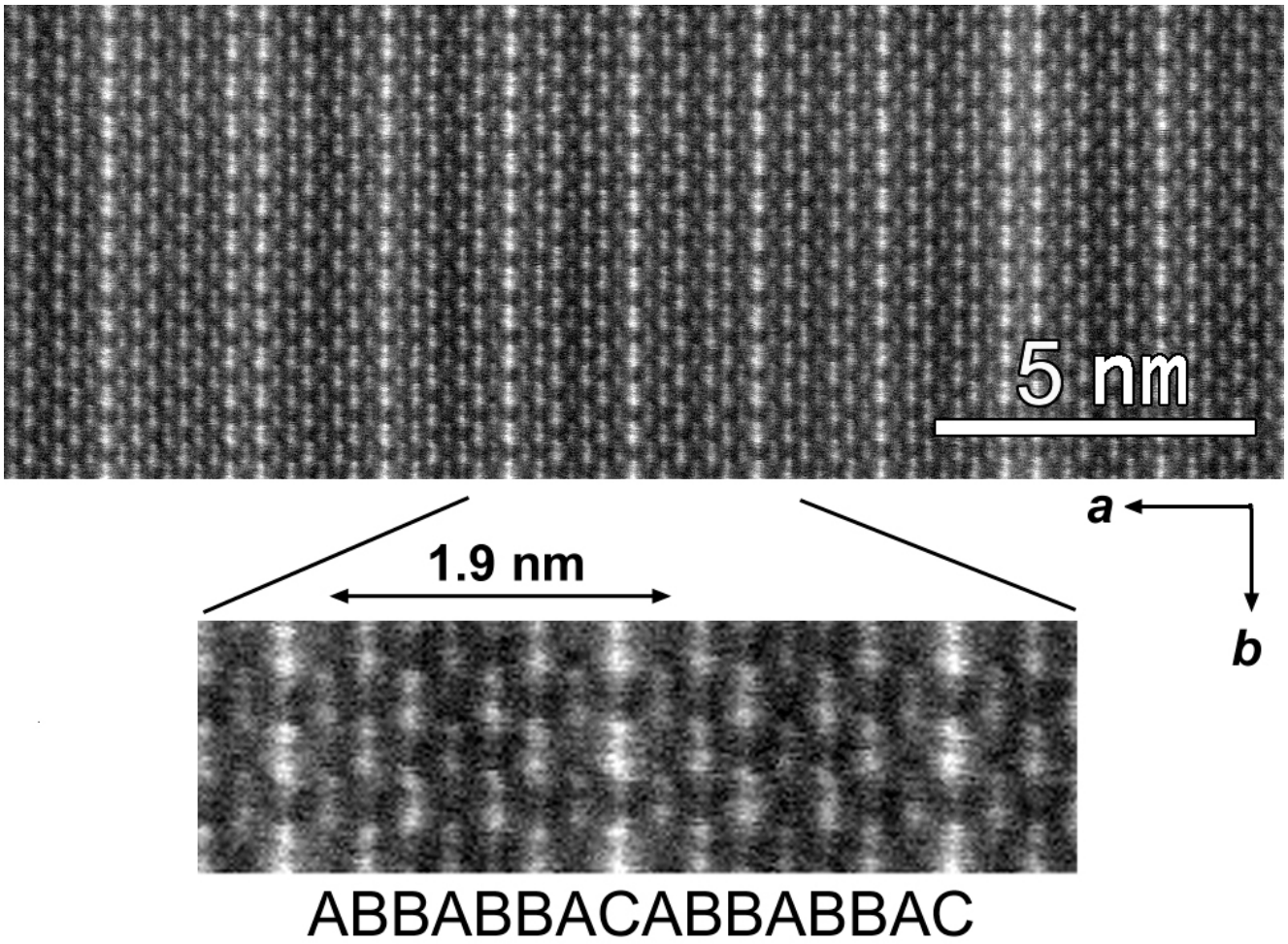
Keywords: corundum, srilankite, transmission electron microscope, 3D atomprobe

HRSTEM observation of columbite supergroup from Hirukawa, Nakatsugawa, Gifu Prefecture, Japan

*Toshihiro KOGURE[1], Yasuyuki Banno[2], Taiga Okumura[1]

1. Univ. Tokyo, Sci, 2. AIST

Keywords: columbite group, wolframite, qitianlingite, STEM, selected area diffraction



Determination of local symmetry within the iridescent garnet from Tenkawa by spatially-resolved electron diffractometry

*Yohei IGAMI[1], Akira Miyake[1]

1. Kyoto Univ. Sci

Keywords: iridescent garnet, local symmetry, electron microscopy, 4D-STEM

Dumortierite and tourmaline from the Takumi Mine, Hyogo Prefecture, Japan

*Yohei SHIROSE[1], Rikako KAMISE[1], Katsuichi NISHIDA, Yoshiteru FUJIWARA

1. Ehime Univ. Sci.

Keywords: dumortierite, tourmaline, Takumi Mine, foitite, magnesio-foitite

Oral presentation

R1: Characterization and description of minerals (Joint Session with The Gemmological Society of Japan)

Chairperson:Hiroshi Kitawaki, Masanori Kurosawa, Yasuyuki Banno
Thu. Sep 14, 2023 1:30 PM - 4:30 PM 820 (Sugimoto Campus)
[座長]
北脇 裕士:R1-01～R1-03
黒澤 正紀:R1-04～R1-07
坂野 靖行:R1-08～R1-11

3:30 PM - 3:45 PM

[1Lecture-101-11-9add]休憩

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Minerals from Nagatare area, Fukuoka

*Seiichiro UEHARA[1]

1. Kyushu Uni. Museum

Keywords: Nagatare

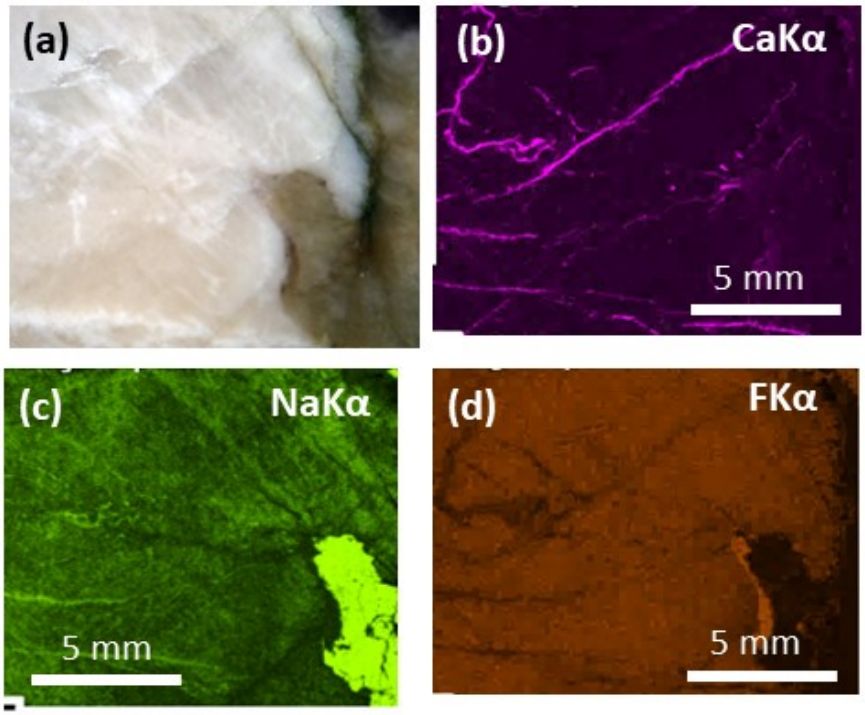


Fig.1. Secondary Ca-Na phosphates veins in Nagatare amblygonite.
(a) Sample photograph.
(b) Ca*Kα* X-ray image obtained by montaged SEM-EDS stage mapping.
(c) Na*Kα* X-ray image. (d) F*Kα* X-ray image.

Occurrence and genesis of zeolites in gastropod fossils in Miocene sediments in Minamisoma, Fukushima, Japan.

*Atsushi Ishihara[1], Hiroaki Ohfuji[1]

1. Tohoku Univ. Sci.

Keywords: Zeolite, Heulandite, Mineralization, fossil



Origins and formation mechanisms of various organic minerals associated with hydrothermal silica veins

*Ryoji Tanaka[1,2], Yuki Inoue[3], Takashi Ishibashi[4], Akihito Hagiwara

1. Sagami Chemical Research Institute, 2. Tokai Univ., 3. Kyushu Univ., 4. Museum of Osaka Univ.

We found polycyclic aromatic hydrocarbon (PAH)-based organic minerals associated with epithermal silica veins at several sites in Japan, including two in Hokkaido. These consist of carpathianite (coronene crystals), benzo[ghi]perylene crystals, picene crystals, and the like. Although some solid-solution behavior is observed, most of them are molecular crystals of organic substances with high purity. This means that fractional crystallization occurs strongly in PAH-based organic minerals. Benzo[ghi]perylene was approved as a new mineral under the name of hokkaidoite.

Keywords: epithermal, polycyclic aromatic hydrocarbon, hokkaidoite, benzo[ghi]perylene, organic minerals

Oral presentation

R1: Characterization and description of minerals (Joint Session with The Gemmological Society of Japan)

Chairperson:Hiroshi Kitawaki, Masanori Kurosawa, Yasuyuki Banno
Thu. Sep 14, 2023 1:30 PM - 4:30 PM 820 (Sugimoto Campus)
[座長]
北脇 裕士:R1-01～R1-03
黒澤 正紀:R1-04～R1-07
坂野 靖行:R1-08～R1-11

[zoom]Zoom

Zoom

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Oral presentation | S2: Water Rock Interaction (Special Session)

Thu. Sep 14, 2023 2:00 PM - 4:30 PM JST | Thu. Sep 14, 2023 5:00 AM - 7:30 AM UTC | 821 Sugimoto Campus

S2: Water Rock Interaction (Special Session)

Chairperson:Noriyoshi Tsuchiya

2:00 PM - 2:05 PM JST | 5:00 AM - 5:05 AM UTC

[1Lecture-201-09-1add] コンビーナ挨拶

2:05 PM - 2:20 PM JST | 5:05 AM - 5:20 AM UTC

[S2-01] Weathering process of Nabari gabbroic body, especially formation of kaolinite/smectite mixed layer mineral

*Shigeru OKUMURA[1] (1. Non)

2:20 PM - 2:35 PM JST | 5:20 AM - 5:35 AM UTC

[S2-02] Occurrence and mineralogy of smectite in petit-spot basalts from the Northwest Pacific

[Presentation award entry]

*Taro KIDO[1], Norikatsu AKIZAWA[2], Yohey SUZUKI[1] (1. Univ. Tokyo, Sci., 2. Univ. Tokyo, AORI)

2:35 PM - 2:50 PM JST | 5:35 AM - 5:50 AM UTC

[S2-03] Dissolution behavior of wollastonite, olivine and basalt with natural chelating agents: features and promotion effects

[Presentation award entry]

*Sena Kikuchi[1], Jiajie Wang[1], Noriyoshi Tsuchiya[1] (1. Tohoku Univ. Environmental sci.)

2:50 PM - 3:05 PM JST | 5:50 AM - 6:05 AM UTC

[S2-04] Two geochemical processes recorded in trace element and Sr-Nd isotopic compositions of the CM1A core samples from the Oman ophiolite

*Masako YOSHIKAWA[1], Tomoyuki Shibata[1], Ikuo Katayama[1], Asyraf Mohamed Aminuddin[2], Ryoko Senda[3], Tomoaki Morishita[2] (1. Hiroshima Univ., 2. Kanazawa Univ., 3. Kyushu Univ.)

3:05 PM - 3:20 PM JST | 6:05 AM - 6:20 AM UTC

[S2-05] Early stages of serpentinization in the mantle section of the Salahi mantle section in the northern Oman ophiolite

Yohki Yoshiba[1], *Eiichi TAKAZAWA[1,2], Toshio Nozaka[3] (1. Niigata Univ. Sci., 2. JAMSTEC, 3. Okayama Univ.Sci.)

3:20 PM - 3:30 PM JST | 6:20 AM - 6:30 AM UTC

[1Lecture-201-09-7add] 休憩

3:30 PM - 3:45 PM JST | 6:30 AM - 6:45 AM UTC

[S2-06] Timing of B-bearing fluid-rock interaction in a subduction zone: an example from the Sanbagawa metamorphic belt

[Presentation award entry]

*Masanori YOKOI[1], Tetsuo KAWAKAMI[1] (1. Kyoto Univ. Sci.)

3:45 PM - 4:00 PM JST | 6:45 AM - 7:00 AM UTC

[S2-07] Behavior of fluorine, relationship between mineralization and water-rock interaction: an example of the Jinmu-Mihara fluorite skarn deposit.

[Presentation award entry]

*Masahiro SUNADA[1], Yasushi Watanabe[1], Takuya Echigo[1], Shogo Aoki[1], Kotaro Seno[1] (1. Akita Univ. Ers.)

4:00 PM - 4:15 PM JST | 7:00 AM - 7:15 AM UTC

[S2-08] Differences in petrophysics of gabbroic rock in ocean drilling core samples from different regions

*Natsue ABE[1,2], Toshiya Fujiwara[1] (1. Japan Agency for Marine-Earth Science and Technology (JAMSTEC), 2. Kanazawa University)

4:15 PM - 4:30 PM JST | 7:15 AM - 7:30 AM UTC

[S2-09] Fluid induced mylonitization and faulting processes

*Jun-ichi ANDO[1,2], Dyuti Prakash Sakar[1,2], Hirotoshi Kotama[1], Kaushik Das[1,2], Gautam Ghosh[3,2], Naotaka Tomioka[4,2] (1. Hiroshima Univ., 2. Hiroshima Univ. HiPeR, 3. Presidency Univ., 4. JAMSTEC)

[zoom] Zoom

Oral presentation

S2: Water Rock Interaction (Special Session)

Chairperson:Noriyoshi Tsuchiya

Thu. Sep 14, 2023 2:00 PM - 4:30 PM 821 (Sugimoto Campus)

2:00 PM - 2:05 PM

[1Lecture-201-09-1add]コンビーナ挨拶

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Weathering process of Nabari gabbroic body, especially formation of kaolinite/smectite mixed layer mineral

*Shigeru OKUMURA[1]

1. Non

Keywords: kaolinite/smectite mixed layer mineral, gabbro, weathering, metastable mineral

Occurrence and mineralogy of smectite in petit-spot basalts from the Northwest Pacific

*Taro KIDO[1], Norikatsu AKIZAWA[2], Yohey SUZUKI[1]

1. Univ. Tokyo, Sci., 2. Univ. Tokyo, AORI

The clay fraction in petit-spots basalts was characterized using X-ray diffraction (XRD), micro-infrared spectroscopy (micro FT-IR), and scanning electron microscopy attached to an energy-dispersive X-ray spectrometer (SEM-EDS). These results revealed the formation of montmorillonite, an Al-rich smectite, in the petit-spot basalts.

Keywords: mantle xenolith, low-temperature alteration, montmorillonite, clay minerals

Dissolution behavior of wollastonite, olivine and basalt with natural chelating agents: features and promotion effects

*Sena Kikuchi[1], Jiajie Wang[1], Noriyoshi Tsuchiya[1]

1. Tohoku Univ. Environmental sci.

Keywords: Organic acid, chelate agents, Mineral dissolution

Two geochemical processes recorded in trace element and Sr-Nd isotopic compositions of the CM1A core samples from the Oman ophiolite

*Masako YOSHIKAWA[1], Tomoyuki Shibata[1], Ikuo Katayama[1], Asyraf Mohamed Aminuddin[2], Ryoko Senda[3], Tomoaki Morishita[2]

1. Hiroshima Univ., 2. Kanazawa Univ., 3. Kyushu Univ.

Keywords: Oman drilling project samples, Sr-Nd isotopic ratios, trace element compositions

Early stages of serpentinization in the mantle section of the Salahi mantle section in the northern Oman ophiolite

Yohki Yoshiba[1], *Eiichi TAKAZAWA[1,2], Toshio Nozaka[3]

1. Niigata Univ. Sci., 2. JAMSTEC, 3. Okayama Univ.Sci.

To understand the early stage of serpentinization processe in the oceanic mantle, we conducted microscopic observations, compositional analyses, and Raman spectroscopic analyses of serpentine and associated minerals in the peridotites of the Salahi mantle section of the Oman Ophiolite. The peridotite contains various proportions of low-temperature serpentines such as lizardite and chrysotile. Antigorite, a high-temperature serpentine, is also widely distributed, but its frequency tends to decrease toward the northwestern part of the mantle section. Most of the antigorite forms veins 0.1 mm to 3.0 mm wide. In the antigorite veins, low-temperature serpentines cut parallel to or across the veins. Fe-rich olivine forms 0.02-0.3 mm wide veins, often accompanied by antigorite veins, in the olivine. The Fo content of common olivine is about 90, whereas that of Fe-rich olivine is 71-88. Antigorite veins in contact with Fe-rich olivine are rich in Mg and poor in Fe. Since Mg-Fe interdiffusivity increases with temperature, it is possible that the antigorite veins formed at high temperatures or that they were heated after formation of veins. The cross-cutting relationships observed in the antigorite veins suggest that olivine, antigorite, chrysotile, magnetite, and carbonate minerals formed in that order. Serpentinization is considered to have progressed with a gradual decrease in temperature. The coexistence of olivine, antigorite, and tremolite suggests the possibility of hydrothermal reactions at 500-600˚C. Furthermore, the presence of lizardite and chrysotile in all samples suggests that extensive water infiltration occurred at temperatures lower than 300˚C. Antigorite and talc are less frequently observed in the northwestern part of the Salahi mantle section suggesting a relationship with paleo-ocean ridge segment structure. Near the end of the ridge segment (south of Salahi brock), seawater may have penetrated deep into the mantle and formed antigorite in the early stages of cooling. On the other hand, near the center of the ridge segment and deeper in the mantle (northwestern part of Salahi block), the formation of antigorite may have been delayed because the temperature remained higher.

Keywords: Oman ophiolite, oceanic mantle, serpentinization, antigorite

Oral presentation

S2: Water Rock Interaction (Special Session)

Chairperson:Noriyoshi Tsuchiya

Thu. Sep 14, 2023 2:00 PM - 4:30 PM 821 (Sugimoto Campus)

3:20 PM - 3:30 PM

[1Lecture-201-09-7add]休憩

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Timing of B-bearing fluid-rock interaction in a subduction zone: an example from the Sanbagawa metamorphic belt

*Masanori YOKOI[1], Tetsuo KAWAKAMI[1]

1. Kyoto Univ. Sci.

Keywords: boron, fluid, subduction zone, Sanbagawa metamorphic belt, mixing zone

Behavior of fluorine, relationship between mineralization and water-rock interaction: an example of the Jinmu-Mihara fluorite skarn deposit.

*Masahiro SUNADA[1], Yasushi Watanabe[1], Takuya Echigo[1], Shogo Aoki[1], Kotaro Seno[1]

1. Akita Univ. Ers.

Keywords: Fluorine, Skarn deposit, Sanyo-belt, Fluorite mineralization, Jinmu-Mihara deposit

Differences in petrophysics of gabbroic rock in ocean drilling core samples from different regions

*Natsue ABE[1,2], Toshiya Fujiwara[1]

1. Japan Agency for Marine-Earth Science and Technology (JAMSTEC), 2. Kanazawa University

Previous scientific ocean drilling has penetrated various localities for gabbroic rocks, a component of the oceanic lower crust. Drilling has been carried out in the Atlantic Ocean with ODP Legs 153 (Kane FZ), Leg 209 (15°20'N FZ), and IODP Exp. 304 & 305 (Atlantis Massif), in the Indian Ocean with ODP Legs 118 & 176 and IODP Exp. 360 at a location known as Atlantis Bank. In the Pacific Ocean, speckled rock samples were collected from Hess Deep by ODP Leg 147 and IODP Exp. 345. These speckled rock core samples are valuable for elucidating the reality of the oceanic lower crust. We found a significant difference in seismic wave velocities from these regions. The Indian Ocean and Pacific Ocean specimens show a relationship between seismic wave velocity and the density of speckled rock, which is generally assumed to be the lower ocean crust. Still, the Atlantic Ocean speckled rock specimens have a seismic wave velocity of about one km/s slower than speckled rock from other localities with similar densities. Possible causes include (1) differences in mineral composition and degree of alteration, (2) differences in porosity (or crack density), (3) differences in degree of deformation, and (4) differences in formation age (temperature). We would like to present the results of our investigation of these causes and discuss the differences in elastic wave velocities.

Keywords: Gabbro, IODP, Oceanic lower crust, compressional velocity, petrophysics

Fluid induced mylonitization and faulting processes

*Jun-ichi ANDO[1,2], Dyuti Prakash Sakar[1,2], Hirotoshi Kotama[1], Kaushik Das[1,2], Gautam Ghosh[3,2], Naotaka Tomioka[4,2]

1. Hiroshima Univ., 2. Hiroshima Univ. HiPeR, 3. Presidency Univ., 4. JAMSTEC

Keywords: Fault, Mylonite, pressure solution creep, Phyllosilicate mineral, Mantle porphyroclast

Oral presentation

S2: Water Rock Interaction (Special Session)

Chairperson:Noriyoshi Tsuchiya

Thu. Sep 14, 2023 2:00 PM - 4:30 PM 821 (Sugimoto Campus)

[zoom]Zoom

Zoom

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Oral presentation | R7: Petrology, Mineralogy and Economic geology (Joint Session with Society of Resource Geology)

Thu. Sep 14, 2023 2:45 PM - 4:30 PM JST | Thu. Sep 14, 2023 5:45 AM - 7:30 AM UTC | 822 Sugimoto Campus

R7: Petrology, Mineralogy and Economic geology (Joint Session with Society of Resource Geology)

Chairperson:Norikatsu Akizawa(Atmosphere and Ocean Research Institute, University of Tokyo), Takuya Echigo(Akita University)

2:45 PM - 3:00 PM JST | 5:45 AM - 6:00 AM UTC

[R7-01] Decomposition of organic matter by hydrothermal alteration in epithermal Au deposit in Kitami area, Hokkaido, Japan

Misato Kuniba[1], *Takuya ECHIGO[1], Yasushi Watanabe[1] (1. Internat. Resour. Sci., Akita Univ.)

3:00 PM - 3:15 PM JST | 6:00 AM - 6:15 AM UTC

[R7-02] The coloration Factor of Pale Blue Sepiolite in amygdales in Higashimatsuura basalt from Kabeshima island, Saga Prefecture, SW Japan

[Presentation award entry]

*Satsuki Kio[1], Terumi Ezima[2], Yoshiaki Kon[3], Hikari Minamisawa[4], Masaomi Horita[4] (1. Shinshu Univ. Sci., 2. Shinshu Univ. Sci. , 3. GSJ, AIST, 4. Shinshu Univ. Eng.)

3:15 PM - 3:30 PM JST | 6:15 AM - 6:30 AM UTC

[R7-03] Formation process of chalcedony at subaqueous volcanism 1 Oku-Matsushima region, Japan

[Presentation award entry]

*Natsuko Sano[1], Tsuyoshi Miyamoto[2], Takahiro Kuribayashi[1], Toshiro Nagase[3] (1. Tohoku Univ. Sci., 2. Tohoku Univ. CNEAS, 3. Tohoku Univ. Museum)

3:30 PM - 3:45 PM JST | 6:30 AM - 6:45 AM UTC

[R7-04] XANES analysis of inclusions containing polycyclic aromatic hydrocarbons in Tahitian mantle xenolith

[Presentation award entry]

*Itaru Mitsukawa[1], Akira Miyake[1], Yohei Igami[1], Yoshio Takahashi[2], Shohei Yamashita[3], Takahiro Kawai[2], Tetsu Kogiso[1], Norikatsu Akizawa[2] (1. Kyoto Univ. Sci., 2. Univ. Tokyo, 3. KEK)

3:45 PM - 4:00 PM JST | 6:45 AM - 7:00 AM UTC

[R7-05] Re-investigation of garnet peridotite xenolith from Salt Lake Crater, Hawaii

*Norikatsu AKIZAWA[1], Akira Ishikawa[2], Ryo Fujita[2], Tomoaki Morishita[3], Akihiro Tamura[3], Takashi Sano[4] (1. Uni. Tokyo, AORI, 2. Tokyo Tech., School Sci., 3. Kanazawa Uni., College Sci. Eng., 4. Natl. Mus. Nat. Sci.)

4:00 PM - 4:15 PM JST | 7:00 AM - 7:15 AM UTC

[R7-06] The preliminary results of piston cylinder experiments to homogenize multiphase solid inclusions observed in high pressure granulites and garnet-bearing peridotite in the Bohemian Massif

*Kosuke NAEMURA[1], Rin Abe[1], Tetsu Kogiso[2] (1. Iwate Univ. Edu., 2. Kyoto Univ. Human Env.)

4:15 PM - 4:30 PM JST | 7:15 AM - 7:30 AM UTC

[R7-07] Application of photon-counting computed tomography to rocks/crystals containing heavy elements

Ayumi Ishiguro[1], Makoto Arimoto[1,3,4], Daichi Sato[1], Takahiro Tomoda[1], Shinsuke Terazawa[5], Satoshi Shiota[5], *Tomoaki MORISHITA[3,2] (1. Kanazawa Univ. Nat. Sci., 2. JAMSTEC, 3. Kanazawa Univ. Sci.Engineer., 4. Waseda Univ. Sci. Engineer. , 5. Proterial Ltd.)

[zoom] Zoom

Decomposition of organic matter by hydrothermal alteration in epithermal Au deposit in Kitami area, Hokkaido, Japan

Misato Kuniba[1], *Takuya ECHIGO[1], Yasushi Watanabe[1]

1. Internat. Resour. Sci., Akita Univ.

Keywords: epithermal gold deposit, organic matter, hydrothermal alteration, clay minerals, Raman spectroscopy

The coloration Factor of Pale Blue Sepiolite in amygdales in Higashimatsuura basalt from Kabeshima island, Saga Prefecture, SW Japan

*Satsuki Kio[1], Terumi Ezima[2], Yoshiaki Kon[3], Hikari Minamisawa[4], Masaomi Horita[4]

1. Shinshu Univ. Sci., 2. Shinshu Univ. Sci. , 3. GSJ, AIST, 4. Shinshu Univ. Eng.

The alkali basalts known as the Higashi-Matsuura basalts are widely distributed on Kabeshima Island, Yobuko area, Saga Prefecture, and pale blue sepiolite has been found in amygdales in the Higashi-Matsuura basalts on the island. A white to light-green sepiolite has been reported previously in Higashi-Matsuura basalts from near Karatsu city (Ishibashi, 1974), but not the sepiolite with a pale blue color. In this study, to investigate of color of the pale blue sepiolite, we analyzed the pale blue sepiolite chemical composition using EPMA, LA-ICPMS and TEM-EDS.
The amygdale minerals in the alkali basalt consist of sepiolite, ilmenite, calcite, Mn oxides and chlorite-like mineral. The pale blue sepiolite has a spongy texture with pores less than 0.5 μm in diameter on the mineral surface and occurs in radial clusters 5-10 μm thick on a yellowish-brown chlorite-like mineral. Quantitative analysis of the pale blue sepiolite showed that it consists mainly of 46.48 wt.% SiO_2, 16.89 wt.% MgO, and 4.69 wt.%Al_2O_3. The trace transition-metal elements detected in the pale blue sepiolite in microscale chemical analysis using LA-ICPMS that might cause coloration in sepiolite are 0.403 wt.% Mn, 0.392 wt.% Fe^{3+}, 0.145 wt.% Cu, 0.036 wt.% Ti, 0.012 wt.% Cr and 0.010 wt.% Ni. However, Fe and Mn are not detected in the nano scale chemical analysis of sepiolite using TEM-EDS. Therefore, Fe and Mn detected in microscale chemical analysis are likely to be due to contamination with other minerals that coexist with the sepiolite, such as Mn oxides and chlorite-like mineral, with Cu being the most abundant transition metal element in the sepiolite.
The result of this study suggests that the transition-metal element Cu is responsible for the pale blue color of the sepiolite. However, Further research is needed to determine whether sepiolite which crystal lattice Cu-containing exhibits pale blue color, because it is no report on the color of Cu bearing sepiolite.

Keywords: Kabeshima Island, sepiolite, copper, alkali basalt

Formation process of chalcedony at subaqueous volcanism 1 Oku-Matsushima region, Japan

*Natsuko Sano[1], Tsuyoshi Miyamoto[2], Takahiro Kuribayashi[1], Toshiro Nagase[3]

1. Tohoku Univ. Sci., 2. Tohoku Univ. CNEAS, 3. Tohoku Univ. Museum

Keywords: Chalcedony, Subaqueous volcanism, Clastic Dyke

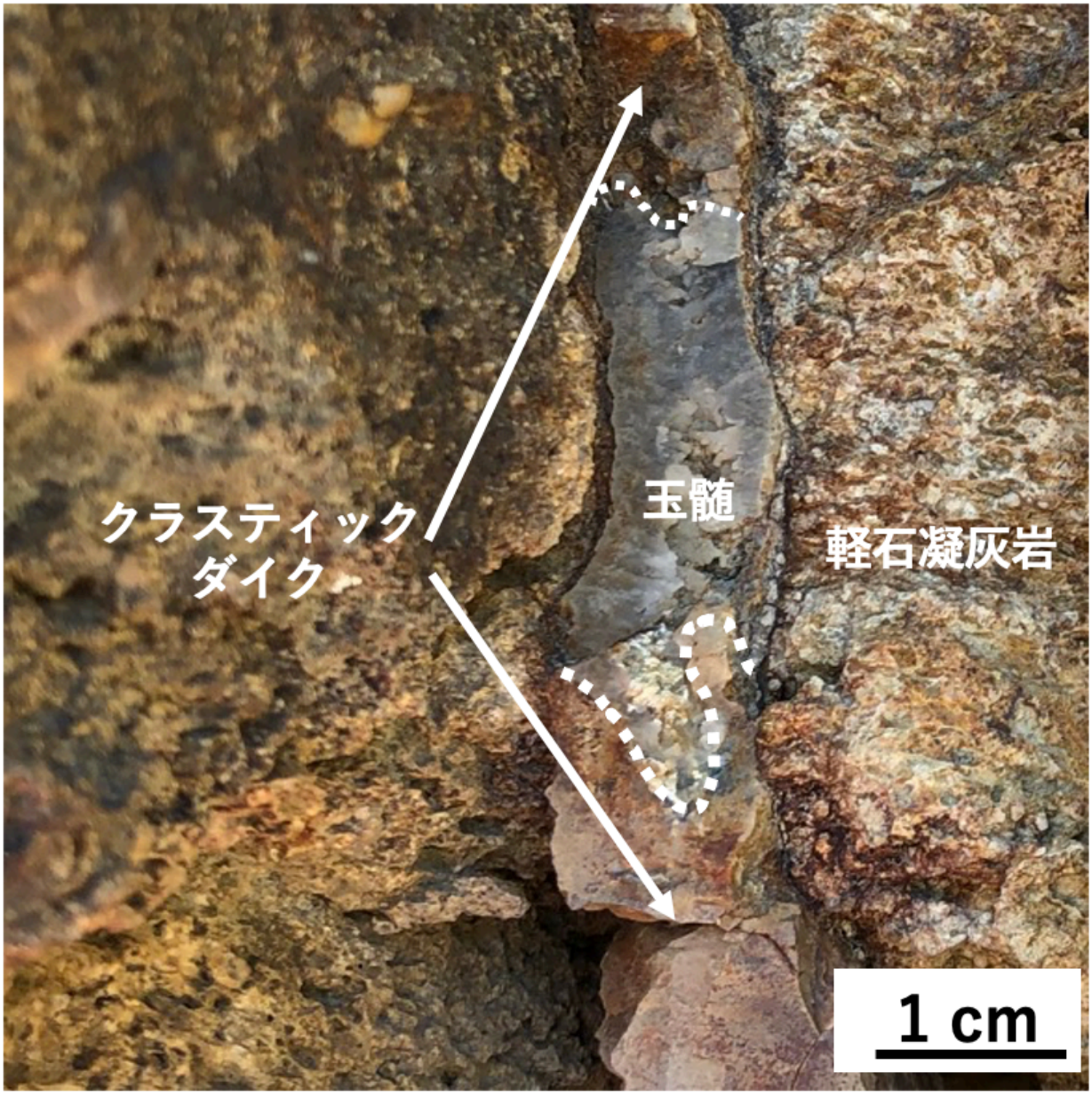


図1. 軽石凝灰岩の割れ目に存在する玉髄

XANES analysis of inclusions containing polycyclic aromatic hydrocarbons in Tahitian mantle xenolith

*Itaru Mitsukawa[1], Akira Miyake[1], Yohei Igami[1], Yoshio Takahashi[2], Shohei Yamashita[3], Takahiro Kawai[2], Tetsu Kogiso[1], Norikatsu Akizawa[2]

1. Kyoto Univ. Sci., 2. Univ. Tokyo, 3. KEK

Keywords: Organic compounds, mantle, pridotite, polycyclic aromatic hydrocarbons, XANES

Re-investigation of garnet peridotite xenolith from Salt Lake Crater, Hawaii

*Norikatsu AKIZAWA[1], Akira Ishikawa[2], Ryo Fujita[2], Tomoaki Morishita[3], Akihiro Tamura[3], Takashi Sano[4]

1. Uni. Tokyo, AORI, 2. Tokyo Tech., School Sci., 3. Kanazawa Uni., College Sci. Eng., 4. Natl. Mus. Nat. Sci.

Keywords: Mantle, Oceanic lithosphere, Garnet, Peridotite

The preliminary results of piston cylinder experiments to homogenize multiphase solid inclusions observed in high pressure granulites and garnet-bearing peridotite in the Bohemian Massif

*Kosuke NAEMURA[1], Rin Abe[1], Tetsu Kogiso[2]

1. Iwate Univ. Edu., 2. Kyoto Univ. Human Env.

In the present-day Alpine Himalayas and the Paleozoic Variscan orogenic belt, ultrapotassic volcanism occurred in the late stages of orogeny. The source of potassium is expected to be subducted pelitic rocks that partially melted and eventually emitted potassium-rich melts to the hanging wall mantle (e.g., Grassi and Schmidt, 2011). This resulted to form phlogopite-bearing peridotite in the mantle wedge, which can generate ultrapotassic magma upon partial melting (durbachite in the Czech Republic and kamafugite in Italy). To quantitatively understand this process, it is first necessary to determine the chemical composition of the partial melts or supercritical fluids both in the subducting plate and in the mantle wedge.High-pressure to ultrahigh-pressure metamorphic rocks may contain melts and supercritical fluids generated in deep plate convergence zones - at depths of 50 to 200 km - that are trapped in high-pressure minerals such as garnet. Melts and supercritical fluids cooled and crystallized to form multiphase solid inclusions. Recently, several studies have focus on their chemical composition and its relationship with post-orogenic ultrapotassic magmatism (e.g. Borghini et al., 2019). To conduct experiments to homogenize the multiphase solid inclusions, a few mm of garnet was first separated from the garnet pyroxene rock and sealed, along with quartz, in a gold capsule. 10% gibbsite was added for hydrous experiment. The samples were kept at 3 GPa and 1000˚C for 24 hours in a piston-cylinder apparatus, then quenched, and observed using an electron microscope. It turned out that most garnet grains are decomposed under wet condition. On the other hand, under dry conditions, the multiphase solid inclusions successfully homogenized whose chemical composition is: SiO_2*=70-74 wt%, Al_2O_3≃12 wt%、MgO=0.3-2.0 wt%, CaO=1.1-1.8 wt%, K_2O=6.0-6.5 wt%. Since the analytical values are 80-87 wt%, the mass of fluid components in the melt is estimated to be 13-20 wt%. On the other hand, melt inclusions in chromite from garnet peridotites is poor in SiO_2 and rich in MgO and CaO, suggesting silica undersaturated melt. This is first preliminary report on homogenization experiments, and we plan to accumulate melt dataset that led to quantitative understanding of the material transfer from subducting plate to the mantle wedge.

Keywords: Continental collision, garnet peridotite, high pressure granulite, multiphase solid inclusion, piston cylinder

Application of photon-counting computed tomography to rocks/crystals containing heavy elements

Ayumi Ishiguro[1], Makoto Arimoto[1,3,4], Daichi Sato[1], Takahiro Tomoda[1], Shinsuke Terazawa[5], Satoshi Shiota[5], *Tomoaki MORISHITA[3,2]

1. Kanazawa Univ. Nat. Sci., 2. JAMSTEC, 3. Kanazawa Univ. Sci.Engineer., 4. Waseda Univ. Sci. Engineer. , 5. Proterial Ltd.

Photon counting CT (PC-CT) uses an energy-resolved X-ray detector, which allows X-rays with a continuous energy spectrum to be detected separately in arbitrary energy regions (Willemink et al. 2018). We report the results of applying a laboratory-built PC-CT to materials containing heavy elements with the characteristic X-ray absorption edge energy in the energy range in which the PC-CT is used. Reference: Willemink et al. (2018) DOI: 10.1148/radiol.2018172656

Keywords: Photon-counting computed tomography

Oral presentation

R7: Petrology, Mineralogy and Economic geology (Joint Session with Society of Resource Geology)

Chairperson:Norikatsu Akizawa(Atmosphere and Ocean Research Institute, University of Tokyo), Takuya Echigo(Akita University)

Thu. Sep 14, 2023 2:45 PM - 4:30 PM 822 (Sugimoto Campus)

[zoom]Zoom

Zoom

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Oral presentation | R2: Crystal structure, crystal chemistry, physical properties of minerals, crystal growth and applied mineralogy

Fri. Sep 15, 2023 9:00 AM - 12:00 PM JST | Fri. Sep 15, 2023 12:00 AM - 3:00 AM UTC | 820 Sugimoto Campus

R2: Crystal structure, crystal chemistry, physical properties of minerals, crystal growth and applied mineralogy

Chairperson:Kazuki 小松 Komatsu, Ryo Yamane(Tohoku Univ.), Mariko Nagashima

9:00 AM - 9:15 AM JST | 12:00 AM - 12:15 AM UTC

[R2-01] Prediction of low-temperature and high-pressure phase transition in keatite (SiO_2)

*Masami KANZAKI[1] (1. Okayama Univ.)

9:15 AM - 9:30 AM JST | 12:15 AM - 12:30 AM UTC

[R2-02] Deformation mechanism of layered silicate minerals by repplocations

*Hiroshi SAKUMA[1], Shigeru Suehara[1], Kenji Tamura[1] (1. National Institute for Materials Science)

9:30 AM - 9:45 AM JST | 12:30 AM - 12:45 AM UTC

[R2-03] Revisiting the mechamism of mixed alkali effect in silicate glass/liquid

*Fumiya NORITAKE[1], Soichiro Naito[1] (1. University of Yamanashi)

9:45 AM - 10:00 AM JST | 12:45 AM - 1:00 AM UTC

[R2-04] Structural variability and stability of FBUs in borate minerals

Nishiyasu Wataru[1], *Atsushi KYONO[1] (1. University of Tsukuba)

10:00 AM - 10:15 AM JST | 1:00 AM - 1:15 AM UTC

[R2-05] Determination of the crystal structure of Earth's constituent materials using in-house single-crystal X-ray diffraction measurements

[Presentation award entry]

*Shuhou MAITANI[1], Ryosuke Sinmyo[1], Takayuki Ishii[2], Kenji Yoza[3] (1. Meiji University, 2. Institute for Planetary Materials, Okayama University, 3. Bruker Japan)

10:15 AM - 10:30 AM JST | 1:15 AM - 1:30 AM UTC

[2Lecture-101-11-6add] 休憩

10:30 AM - 10:45 AM JST | 1:30 AM - 1:45 AM UTC

[R2-06] Calorimetric study of cation disordering in $MgAl_2O_4$ spinel

*Hiroshi KOJITANI[1], Ryuji MATSUKI[1], Itaru OHIRA[1] (1. Gakushuin Univ. Sci.)

10:45 AM - 11:00 AM JST | 1:45 AM - 2:00 AM UTC

[R2-07] NMR study on Al local structures in Al-bearing $CaTiO_3$ perovsskite

*Takaya NAGAI[1], Xianyu XUE[2] (1. Hokkaido Univ. Sci., 2. Okayama Univ. IPM)

11:00 AM - 11:15 AM JST | 2:00 AM - 2:15 AM UTC

[R2-08] Crystal structure of vaterite proposed by ABF/ADF-STEM

*Taiga OKUMURA[1], Gen TAKAHASHI[1], Toshihiro KOGURE[1] (1. UTokyo Sci.)

11:15 AM - 11:30 AM JST | 2:15 AM - 2:30 AM UTC

[R2-09] Effect of solution pH at synthesis on the crystallization behavior of amorphous calcium carbonate

*Chiho Morita[1], Kensuke Muraoka[1], Hiroki Kobayashi[1], Hiroyuki Kagi[1] (1. Tokyo Univ. Sci.)

11:30 AM - 11:45 AM JST | 2:30 AM - 2:45 AM UTC

[R2-10] Ordered Distribution of Ag and Cu in cosalite studied by Anomalous X-ray Scattering

*Ryo YAMANE[1], Takashi Mikouchi[2], Kunihisa Sugimoto[3], Toru Ozawa[4], Kazumasa Sugiyama[1] (1. Tohoku Univ. IMR, 2. Univ. of Tokyo UMUT, 3. KINDAI Univ., 4. Univ. of Tokyo Sci.)

11:45 AM - 12:00 PM JST | 2:45 AM - 3:00 AM UTC

[R2-11] Syntheses and single crystal structure analyses of Ir_2S_3 kashinite and Rh_2S_3 bowieite

*Akira YOSHIASA[1], Makoto Tokuda[1], Ginga Kitahara[1], Satoko Ishimaru[1], Akihiko Nakatsuka[2], Kazumasa Sugiyama[3] (1. Kumamoto University, 2. Yamaguchi University, 3. Tohoku University)

[zoom] Zoom

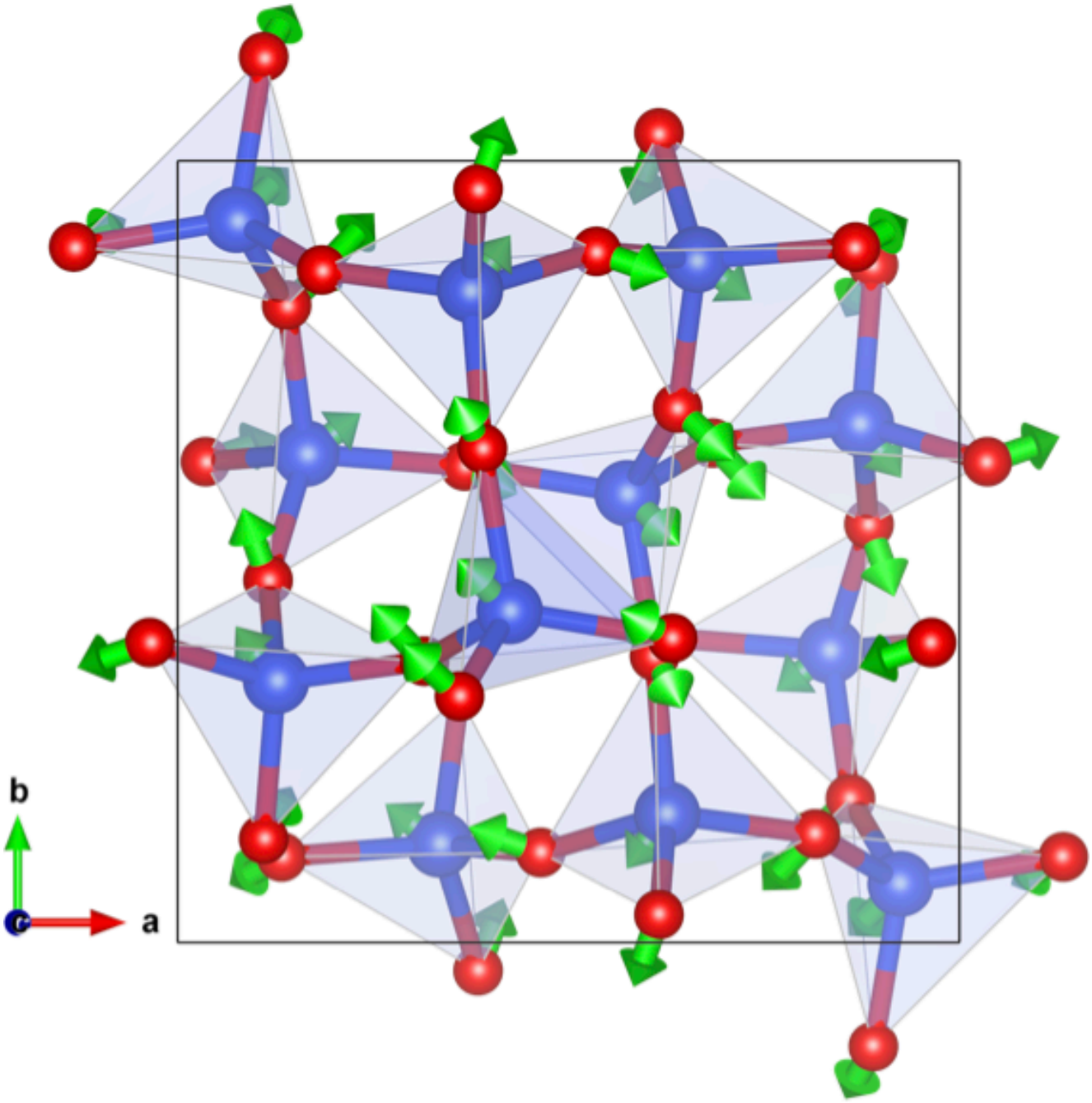
Prediction of low-temperature and high-pressure phase transition in keatite (SiO_2)

*Masami KANZAKI[1]

1. Okayama Univ.

Keatite is a naturally rare polymorph of SiO_2 that has no stable region. Although keatite is not the official mineral name, it has been widely used for over 60 years and is used here as well. keatite shows negative volume thermal expansion from room temperature to 250 ºC (P. Keat, Science, 120, 328-339, 1954), which is unique among the low-pressure silica polymorphs. To explain this, we hypothesized that room temperature keatite is a high-temperature phase like beta-quartz. To test this, we performed DFT and classical MD calculations.
Vibrational mode calculations at ambient pressure of 0 K revealed a soft mode (see Figure), from which the structure changes from the original tetragonal keatite structure to a slightly distorted orthorhombic lattice. The transition to this orthorhombic phase occurs above 0.4 GPa. From MD calculations at ambient pressure, it was observed that the time-averaged *a*/*b*-axis ratio deviates from 1 at low temperatures. Even near room temperature, it oscillates in time between two equivalent tetragonal structures, suggesting that the tetragonal keatite is realized as a time average. Similar to beta-quartz, the negative thermal expansion coefficient in keatite may be due to its high-temperature phase. The hypothesis is supported by the calculations. However, the orthorhombic phase has not been experimentally confirmed at temperatures down to -100 ºC at this time. Further experiments are ongoing.

Keywords: keatite, SiO2, phase transition, negative thermal expansion coefficient, molecular dynamics



B_1 soft mode displacement of tetragonal keatite (SiO_2)

Deformation mechanism of layered silicate minerals by repplocations

*Hiroshi SAKUMA[1], Shigeru Suehara[1], Kenji Tamura[1]

1. National Institute for Materials Science

Keywords: Ripplocations, Muscovite, Molecular dynamics, Shear

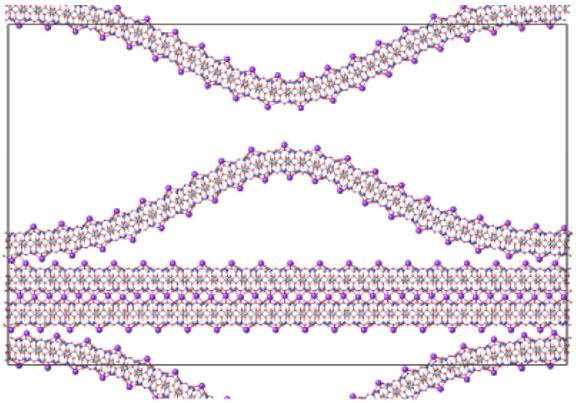


図 1 a

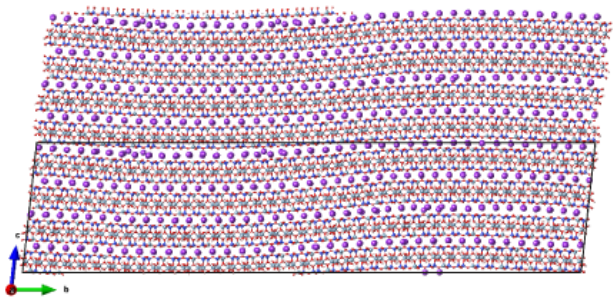


図 1 b

Revisiting the mechamism of mixed alkali effect in silicate glass/liquid

*Fumiya NORITAKE[1], Soichiro Naito[1]

1. University of Yamanashi

Keywords: Silicate Liquid, Silicate Glass, Molecular Dynamics Simulation, Mixed Alkali Effect

Structural variability and stability of FBUs in borate minerals

Nishiyasu Wataru[1], *Atsushi KYONO[1]

1. University of Tsukuba

As increasing temperature, tincalconite $Na_2B_4O_5(OH)_4 \cdot 3H_2O$ appeared at 30°C as a dehydrated phase and decomposed at 160°C. Subsequently, gamma-$Na_2B_4O_7$ crystallized as an anhydrous phase at 600°C and changed to alpha-$Na_2B_4O_7$ at 650°C. The FBU of borax consists of two three-membered rings, each of which is composed of a BO_3 triangle and two BO_4 tetrahedra. Tincalconite has the same FBU as borax. On the other hand, the FBU of gamma-$Na_2B_4O_7$ consists of a three-membered ring consisting of one BO_3 triangle and two BO_4 tetrahedra and two BO_3 triangles and one BO_4 tetrahedra sharing a BO_4 tetrahedron. Alpha-$Na_2B_4O_7$ is composed of two types of FBUs: one is the same as gamma-$Na_2B_4O_7$ and another is a three-membered ring consisting of two BO_3 triangles and one BO_4 tetrahedron. Therefore, the dehydrated and anhydrous phases appearing during the thermal decomposition are characterized by the fact that a three-membered ring consisting of one BO_3 triangle and two BO_4 tetrahedra is common to the borax FBUs. The total energies of the FBUs of representative borate minerals are compared. The most widely occurring borate minerals are borax, colemanite, ulexite, and kernite. The FBU of colemanite is a three-membered ring consisting of one BO_3 triangle and two BO_4 tetrahedra. The FBUs of ulexite and kernite also contain a three-membered ring consisting of one BO_3 triangle and two BO_4 tetrahedra. The FBUs of borax, colemanite, ulexite, and kernite have a common ring, and the total energy of each is relatively lower among borate minerals. Therefore, the structural stability of the FBUs is almost consistent with the frequency of occurrence of borate minerals. The frequency of occurrence of three-membered rings is determined by Burns et al. (1995), which is in good agreement with the results of quantum chemical calculations. The total energies of the FBUs of alpha-$Na_2B_4O_7$ and gamma-$Na_2B_4O_7$ were clearly higher than those of borax. This may support the fact that the anhydrous $Na_2B_4O_7$ phase has five polymorphs and easily changes the FBU geometry without requiring large amounts of energy.

Keywords: Borate minerals, Borax, Structural variability, Fundamental Building Units, Quantum chemical calculation

Determination of the crystal structure of Earth’s constituent materials using in-house single-crystal X-ray diffraction measurements

*Shuhou MAITANI[1], Ryosuke Sinmyo[1], Takayuki Ishii[2], Kenji Yoza[3]

1. Meiji University, 2. Institute for Planetary Materials, Okayama University, 3. Bruker Japan

The crystal structures of Earth’s constituent materials are fundamental information to understand the physical and chemical properties of the interior of the solid Earth. While X-ray diffraction (XRD) measurement is a widely used technique to determine the crystal structures of materials, the single-crystal XRD measurement is the most powerful tool for crystal structure refinement. Recent studies have discovered many new crystal structures likely stable in the Earth’s deep interior by the single-crystal XRD measurement in diamond inclusions, shock veins in meteorites, and the recovered samples of high-pressure experiments. Here we performed *ex-situ*/*in-situ* single-crystal XRD measurements in the sample of high-pressure experiments using an advanced X-ray diffractometer (Bruker, D8 Venture). In the *ex-situ* measurement, we have measured Fe-, Al-bearing bridgmanite, and Fe_5O_6 iron oxide synthesized in a multi-anvil cell. Results showed that required measurements were completed in the single crystals with grain sizes of several 10 mm. The crystal structure refinement was successfully completed to reach an R factor of ~ 0.02. In the *in-situ* measurements, we measured $ZrSiO_4$ zircon under high pressure using Boehler-Almax type DAC with a wide aperture angle. Although the R factor was relatively higher than *ex-situ* measurements, crystal structure refinement succeeded under high pressure. The results of *in-situ* high-pressure single-crystal XRD indicated that the data quality is largely affected by the hydrostatic condition in the DAC sample and the precision of the sample position. In-house apparatus is effective for measurements with many samples since there is no time limitation compared to measurements at a synchrotron radiation facility. As a strong complement to the synchrotron facility, the advanced in-house single-crystal XRD measurement is expected to contribute to the studies in solid earth science via crystallographic analysis of the experimental, geological, and meteoritic samples.

Keywords: single-crystal X-ray diffraction measurements

Oral presentation

R2: Crystal structure, crystal chemistry, physical properties of minerals, crystal growth and applied mineralogy

Chairperson:Kazuki 小松 Komatsu, Ryo Yamane(Tohoku Univ.), Mariko Nagashima
Fri. Sep 15, 2023 9:00 AM - 12:00 PM 820 (Sugimoto Campus)

10:15 AM - 10:30 AM

[2Lecture-101-11-6add]休憩

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Calorimetric study of cation disordering in $MgAl_2O_4$ spinel

*Hiroshi KOJITANI[1], Ryuji MATSUKI[1], Itaru OHIRA[1]

1. Gakushuin Univ. Sci.

Keywords: MgAl2O4, spinel, drop-solution calorimetry, cation disorder

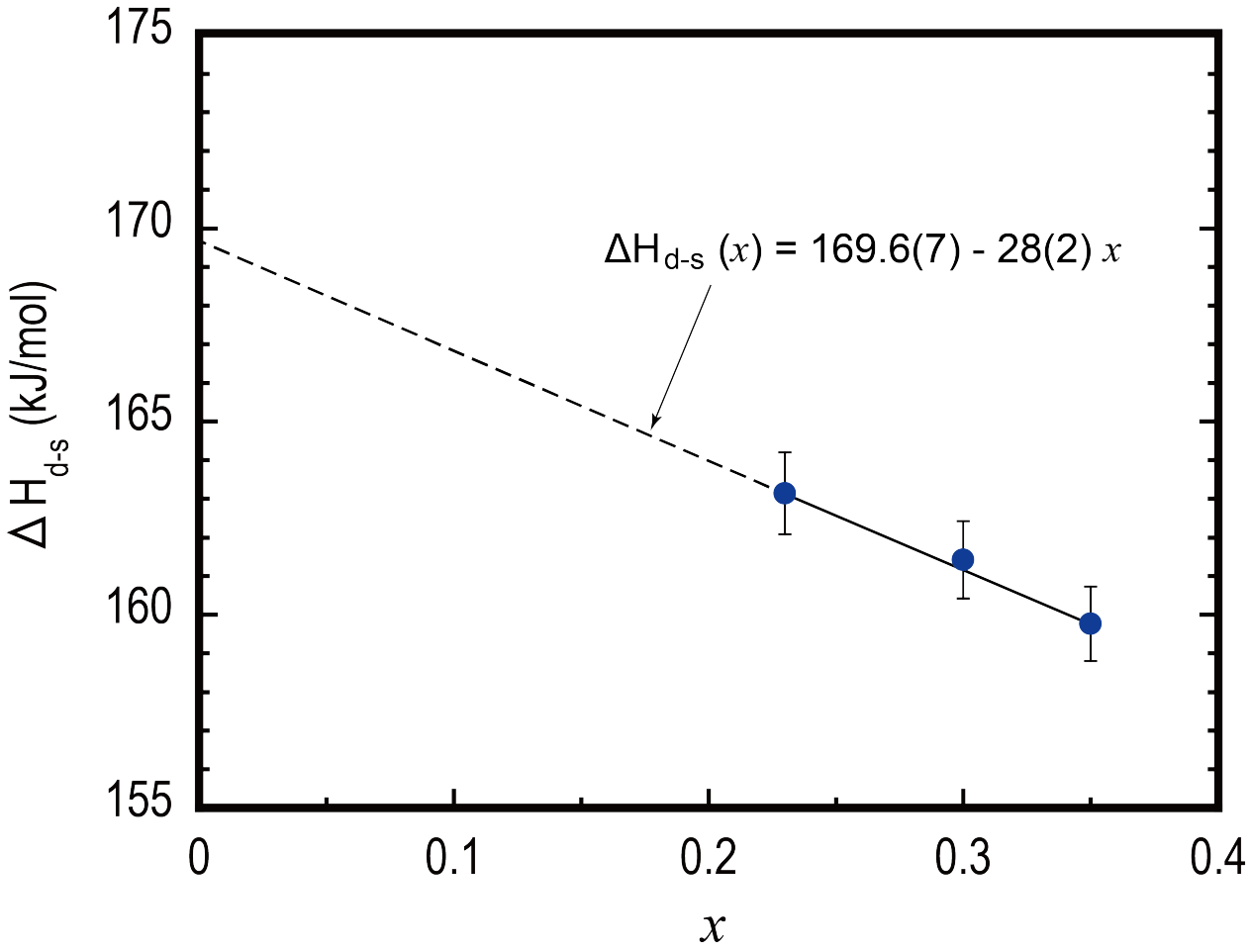


Fig. 1. $MgAl_2O_4$スピネルの無秩序の程度 x と落下溶解エンタルピーの関係

NMR study on Al local structures in Al-bearing $CaTiO_3$ perovsskite

*Takaya NAGAI[1], Xianyu XUE[2]

1. Hokkaido Univ. Sci., 2. Okayama Univ. IPM

The solid solution mechanism involving the substitution of trivalent cations for only Ti^{4+} occupying the B site in titanate perovskite has been studied in relation to electrical properties in materials science. This mechanism is important because it involves the formation of oxygen defects for charge compensation. On the other hand, the solid solution mechanism where Si^{4+} is replaced by Al^{3+} in $MgSiO_3$ bridgemite is also attracting attention in deep earth science, as it may be related to elastic properties and water solubility.

In this study, we have investigated the solid solution formation of Al^{3+} in $CaTiO_3$ perovskite. In previous JAMS annual meetings, we reported that the solid solution of $Ca(Ti_{1-x}Al_x)O_{3-\delta}$ forms in the composition range of $0<x<0.25$ under atmospheric pressure. The lattice volume decreases monotonically with the incorporation of Al^{3+}, and a series of morphotropic structural changes from orthorhombic to tetragonal to cubic occur in the composition range of $0.21<x<0.25$, which is close to the solid solution limit.

To obtain more information about the distribution of oxygen defects introduced into the structure, we performed ^{27}Al-NMR measurements using the joint-use facilities of the Institute for Planetary Materials, Okayama University. This method is useful for understanding the local structure of Al. As a preliminary result, we have already reported that the local structure of Al is mainly VI coordinated, with some IV and V coordinated elements (Fig.1(b)). In this talk, we will discuss the local structure of Al in Al-bearing $CaTiO_3$ perovskites in more detail, including the results of 2D-^{27}Al-3QMAS-NMR measurements (Fig. 1(a)).

Keywords: Al-bearing CaTiO3 perovskite, Al local structures, NMR

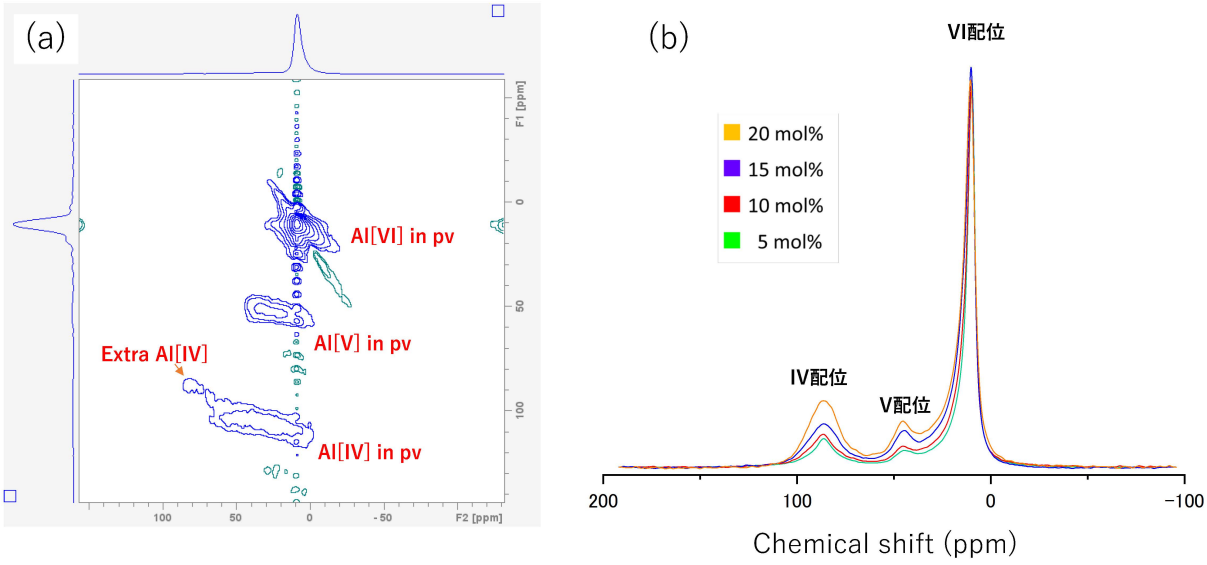


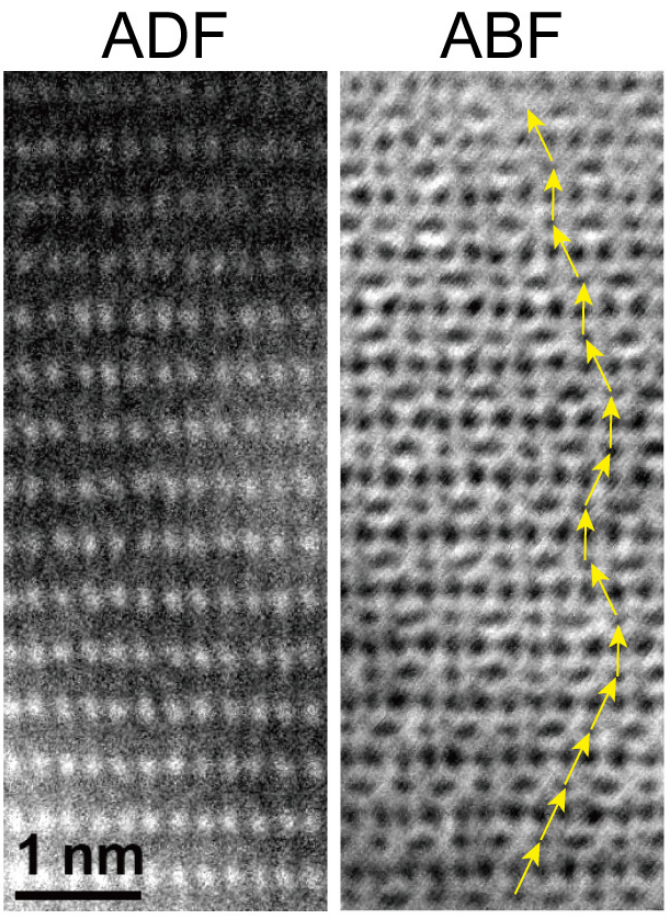
図1(a) 2D-^{27}Al -3QMAS NMR at $x = 0.05$ (b) Compositional variation of spinning sideband sums

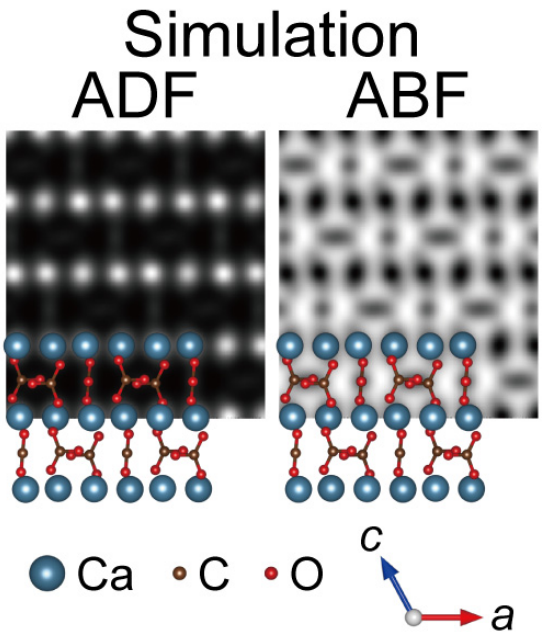
Crystal structure of vaterite proposed by ABF/ADF-STEM

*Taiga OKUMURA[1], Gen TAKAHASHI[1], Toshihiro KOGURE[1]

1. UTokyo Sci.

Keywords: vaterite, ABF-STEM, crystal structure, calcium carbonate, stacking fault





（左）vaterite の ADF/ABF-STEM 像。黄色の矢印は入射電子線と平行な三角形平面を持つ炭酸イオンの位置のずれを示す。ただし画像下方に向かって Ca の位置が少しずつ右にずれているのは試料ドリフトによる。
（右）Mugnaioli et al. (2012) で提案されたモデルの ***b*** 軸入射における ADF/ABF-STEM 像のシミュレーション。

Effect of solution pH at synthesis on the crystallization behavior of amorphous calcium carbonate

*Chiho Morita[1], Kensuke Muraoka[1], Hiroki Kobayashi[1], Hiroyuki Kagi[1]

1. Tokyo Univ. Sci.

Keywords: Amorphous calcium carbonate, Calcite, Vaterite

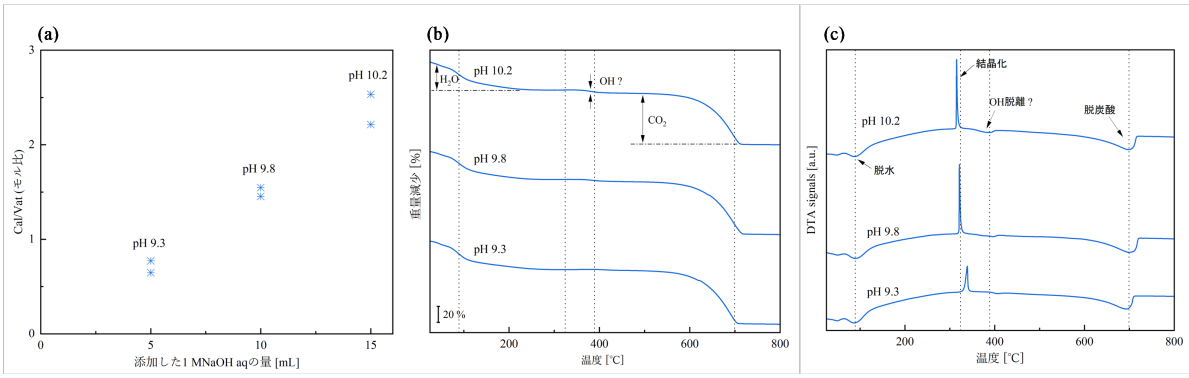


図 1. (a) NaOH aq 添加量とカルサイト/ファーテライト比　(b) TG 曲線　(c) DTA 曲線

Ordered Distribution of Ag and Cu in cosalite studied by Anomalous X-ray Scattering

*Ryo YAMANE[1], Takashi Mikouchi[2], Kunihisa Sugimoto[3], Toru Ozawa[4], Kazumasa Sugiyama[1]

1. Tohoku Univ. IMR, 2. Univ. of Tokyo UMUT, 3. KINDAI Univ., 4. Univ. of Tokyo Sci.

Keywords: cosalite, Anomalous X-ray scattering, Sulfosalt mineral

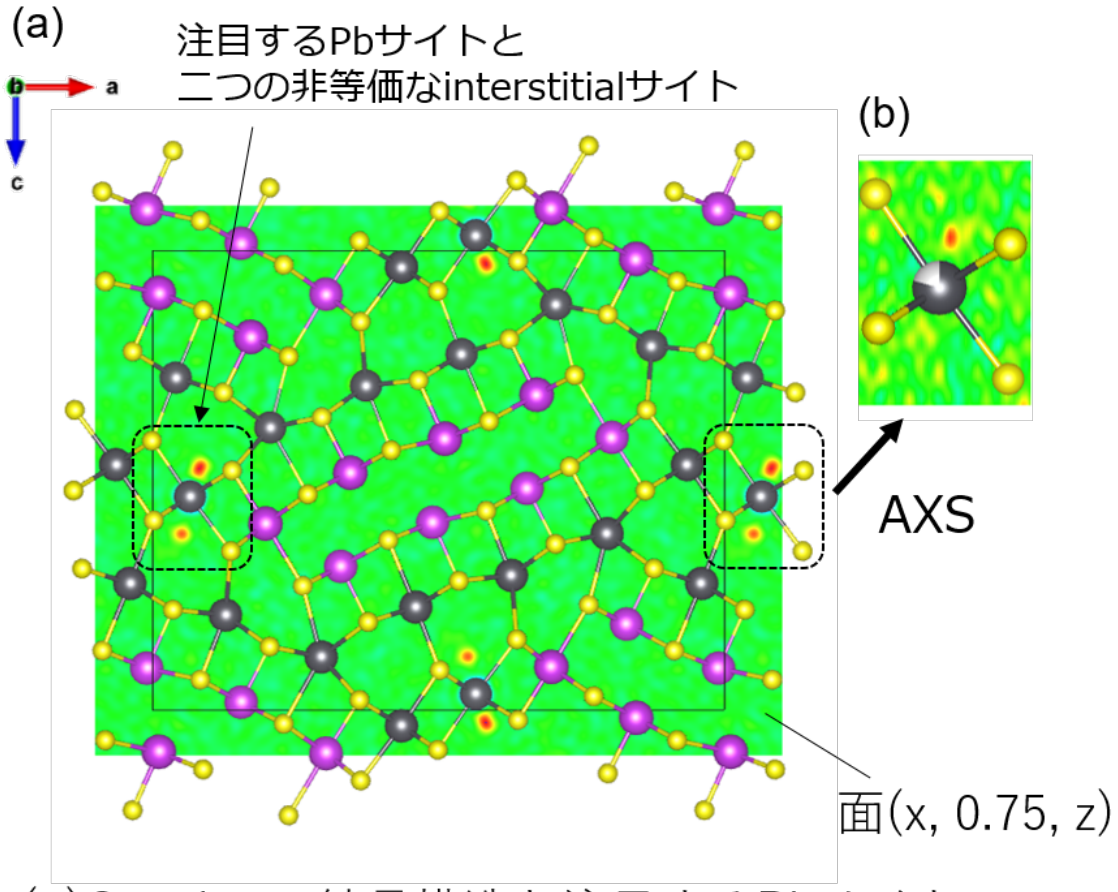


図1. (a)Cosaliteの結晶構造と注目するPbサイト
(b) AXS法で得られたPbサイト近傍のコントラストマップ

Syntheses and single crystal structure analyses of Ir_2S_3 kashinite and Rh_2S_3 bowieite

*Akira YOSHIASA[1], Makoto Tokuda[1], Ginga Kitahara[1], Satoko Ishimaru[1], Akihiko Nakatsuka[2], Kazumasa Sugiyama[3]

1. Kumamoto University, 2. Yamaguchi University, 3. Tohoku University

The crystal structures of Ir_2S_3 [space group *P*bcn, a = 8.4728(3), b = 6.01563(18), c = 6.1537(2) Å] and Rh_2S_3 [space group *P*bcn, a = 8.4672(3), b = 5.98537(18), c = 6.13921(19) Å] were determined by single-crystal X-ray diffraction analysis and refined to yield *R1* values of 0.0174 and 0.0176 for 1092 and 1025 unique reflections, respectively. These compounds have a unique sesquisulfide structure in which pairs of face-sharing octahedra are linked to a three-dimensional structure by further edge- and vertex-sharing. The bulk Debye temperature for Rh_2S_3 bowieite (533K) was lower than that for Ir_2S_3 kashinite (576 K), which crystallizes in the early sequences of mineral crystallization differentiation from the primitive magma in Earth’ s mantle.

Keywords: Ir2S3 kashinite, Rh2S3 bowieite, single crystal diffraction, Debye temperature,, Mantle constituent mineral

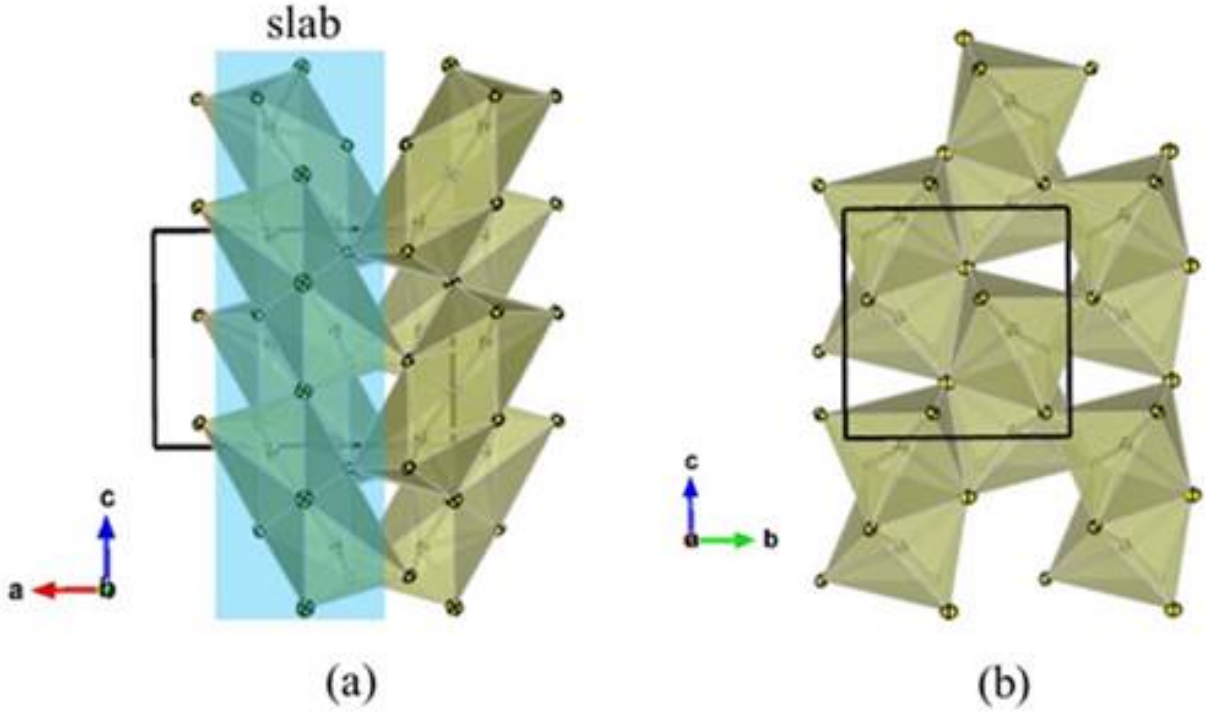


Fig. 1. Crystal structure of Ir_2S_3 view parallel to the crystallographic axes. The distorted IrS_6 octahedron forms an Ir_2S_9 unit by sharing one face with the adjacent octahedron (a). Ir_2S_9 becomes a slab parallel to (100) by sharing four edges with adjacent units (b).

Oral presentation

R2: Crystal structure, crystal chemistry, physical properties of minerals, crystal growth and applied mineralogy

Chairperson:Kazuki 小松 Komatsu, Ryo Yamane(Tohoku Univ.), Mariko Nagashima
Fri. Sep 15, 2023 9:00 AM - 12:00 PM 820 (Sugimoto Campus)

[zoom]Zoom

Zoom

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Oral presentation | R8: Metamorphic rocks and tectonics

Fri. Sep 15, 2023 9:00 AM - 12:00 PM JST | Fri. Sep 15, 2023 12:00 AM - 3:00 AM UTC | 821 Sugimoto Campus

R8: Metamorphic rocks and tectonics

Chairperson:Shunsuke Endo, Fumiko Higashino

9:00 AM - 9:15 AM JST | 12:00 AM - 12:15 AM UTC

[R8-01] Trace elements and strontium isotope geochemistry of phengite in pelitic schists from the Sambagawa Belt, central Shikoku

[Presentation award entry]

*Hironobu Harada[1], Tatsuki Tsujimori[1], Maureen Feineman[2], Kazumasa Aoki[3], Tetsumaru Itaya[4] (1. Tohoku Univ., 2. Penn State, 3. Okayama Univ. Sci., 4. jGnet)

9:15 AM - 9:30 AM JST | 12:15 AM - 12:30 AM UTC

[R8-02] Methane-bearing olivine-hosted fluid inclusions in a contact metamorphosed dolomitic marble from the Miyako area, Kitakami Mountains

*Hironobu Harada[1], Tatsuki Tsujimori[1] (1. Tohoku Univ.)

9:30 AM - 9:45 AM JST | 12:30 AM - 12:45 AM UTC

[R8-03] **Amphibolite-Granulite facies metamorphism at the base of island arcs: Clues from Calaton Hill, Tablas island, Philippines**

*Gabriel Theophilus V. VALERA[1], Andrew Exequiel S. Tabilog[1], John Kenneth B. Badillo[1], Betchaida D. Payot[1] (1. Univ. of the Philippines)

9:45 AM - 10:00 AM JST | 12:45 AM - 1:00 AM UTC

[R8-04] **Brittle fracturing during the closure of the Maizuru back-arc basin**

*Larissa NGOMBI MAVOUNGOU[1], Kaushik DAS[1,2], Dyuti Prakash SARKAR[1,2], Jun-ichi ANDO[1,2], Yasutaka HAYASAKA[1,2] (1. Hiroshima Univ., 2. HiPeR, Hiroshima)

10:00 AM - 10:15 AM JST | 1:00 AM - 1:15 AM UTC

[R8-05] **Elucidation of slip characteristics in shallow crustal faults from deformation experiments on sandstone gouges within Himalayan Main Frontal Thrust**

*Dyuti Prakash SARKAR[1,2], Takehiro Hirose[2,3] (1. Hiroshima University, 2. HiPeR, 3. KCC JAMSTEC)

10:15 AM - 10:30 AM JST | 1:15 AM - 1:30 AM UTC

[R8-06] Handling of the data obtained by quartz Raman barometry

*Yui KOUKETSU[1] (1. Nagoya Univ. Env.)

10:30 AM - 10:45 AM JST | 1:30 AM - 1:45 AM UTC

[2Lecture-201-11-7add] 休憩

10:45 AM - 11:00 AM JST | 1:45 AM - 2:00 AM UTC

[R8-07] Metagabbro from the Sanbagawa belt in western Shikoku, and its roles in deep underplating of subducting oceanic crust

*Shunsuke ENDO[1], Nachi Kurihara[1], Tomoki Taguchi[2] (1. Shimane University, 2. Waseda University)

11:00 AM - 11:15 AM JST | 2:00 AM - 2:15 AM UTC

[R8-08] **An approach to understand the mode of formation of titanite microtube texture in Tumbiana formation stromatolite, Pilbara Craton, western Australia**

*Kiran SASIDHARAN[1], Yoshihiro Nakamura[2], Satish-Kumar Madhusoodhan[1], Ohfuji Hiroaki[3] (1. Niigata University, 2. Geological Survey of Japan, AIST, 3. Tohoku University)

11:15 AM - 11:30 AM JST | 2:15 AM - 2:30 AM UTC

[R8-09] Morphology and residual elastic stress of coesite within kayanite from the UHP whiteschist of the Southern Dora-Maira Massif

*Nami Takeda[1], Tatsuki Tsujimori[1,2], Tatsuhiko Kawamoto[3], Tetsumaru Itaya[4] (1. Tohoku Univ. Sci, 2. Tohoku Univ. CNEAS, 3. Shizuoka Univ. Sci, 4. jGnet)

11:30 AM - 11:45 AM JST | 2:30 AM - 2:45 AM UTC

[R8-10] On the evaluation of the phengite K-Ar age of the Lawsonite blueschist: Examples from the Horokanai area in the Kamuikotan Belt and the Hakoishi-unit in the Kurosegawa Belt.

*Takao HIRAJIMA[1], Kosuke Naemura[2] (1. Kyoto University, 2. Iwate University)

11:45 AM - 12:00 PM JST | 2:45 AM - 3:00 AM UTC

[R8-11] Precipitation of graphite in continental crust from CO_2-rich fluids: Evidence from fluid inclusions, Raman spectroscopy and carbon stable isotopes

*Madhusoodhan SATISH-KUMAR[1], Sasidharan KIRAN[1], Kana UMETSU[1], Sanjeewa MALAVIARACHCHI[2] (1. Niigata University, 2. University of Peradeniya)

[zoom] Zoom

Trace elements and strontium isotope geochemistry of phengite in pelitic schists from the Sambagawa Belt, central Shikoku

*Hironobu Harada[1], Tatsuki Tsujimori[1], Maureen Feineman[2], Kazumasa Aoki[3], Tetsumaru Itaya[4]

1. Tohoku Univ., 2. Penn State, 3. Okayama Univ. Sci., 4. jGnet

Keywords: phengite, Sambagawa Belt, trace element, strontium isotope ratio, exhumed slab

Methane-bearing olivine-hosted fluid inclusions in a contact metamorphosed dolomitic marble from the Miyako area, Kitakami Mountains

*Hironobu Harada[1], Tatsuki Tsujimori[1]

1. Tohoku Univ.

Keywords: dolomitic marble, olivine, fluid inclusion, methane, contact metamorphism

Amphibolite-Granulite facies metamorphism at the base of island arcs: Clues from Calaton Hill, Tablas island, Philippines

*Gabriel Theophilus V. VALERA[1], Andrew Exequiel S. Tabilog[1], John Kenneth B. Badillo[1], Betchaida D. Payot[1]

1. Univ. of the Philippines

The Philippine island arc system preserve records of multiple orogenic events throughout its history. In particular, the rifting and drifting of the Palawan-Mindoro Microcontinental block from mainland Asia and its subsequent collision with the Philippine Mobile Belt likely caused the exhumation of oceanic lithosphere fragments in western Philippines and the regional metamorphism in the area. Uncertainties still abound however on the exact location of this arc-continent collision zone and its timing relative to other tectonic events in the region (e.g. arc magmatism, opening of the South China Sea Basin). Detailed estimation of the pressure-temperature-deformation-time (*P-T-D-t*) history of the different metamorphic units in the region which are required in order to link these metamorphic rocks with each other and to the PMB-PCB collision are also lacking. In Tablas island of the Romblon Island Group, earlier studies identified at least two distinct stages of metamorphism: a prevalent greenschist to amphibolite facies event recorded in most Romblon metamorphic rocks, and a higher *T* amphibolite-granulite facies metamorphism preserved in the southeast section of the island in Calaton Hill. In this work, we present new field and petrological data from exposures in and around Calaton Hill. Calaton Hill is mainly composed of gabbros and pyroxenite-hornblendites thought to represent the base of an ancient arc. Samples from the area revealed both unmetamorphosed, i.e. with cumulate texture, and highly foliated gabbroic-ultramafic lithologies. The lithologies comprise varying amounts of olivine, clino- and orthopyroxenes, plagioclase and hornblende with the metamorphosed variety only exhibiting grain size reduction and foliation. The surrounding paraschists in Calaton Hill meanwhile are composed of aluminosilicates, biotite, quartz, and alkali feldspar. These assemblages suggest high *T* metamorphism in SE Tablas island.

Keywords: Calaton Hill, Tablas, Romblon Metamorphic rocks, Amphibolite and granulite facies

Brittle fracturing during the closure of the Maizuru back-arc basin

*Larissa NGOMBI MAVOUNGOU[1], Kaushik DAS[1,2], Dyuti Prakash SARKAR[1,2], Jun-ichi ANDO[1,2], Yasutaka HAYASAKA[1,2]

1. Hiroshima Univ., 2. HiPeR, Hiroshima

The Maizuru basin is a Permian paleo back-arc basin that opened during Early Permian with the deposition of a massive mudstone-dominated cover, the Maizuru Group lying on the Yakuno ophiolitic rocks that constitute the basement of the basin. During the Permo-Triassic boundary, the Maizuru back-arc basin closed with the deposition of the breccia-dominated Tonoshiki Formation. This closure occurred in a tectonically active environment generating two pulses of debris flow events and the formation of two types of the Tonoshiki breccia. Field investigation and microscopic observations revealed the presence of an intensive fracture network in the Tonoshiki breccia. A considerable amount of calcite veins is present in the breccia. The fracture analysis conducted on the Tonoshiki breccia allowed a tentative reconstruction of the paleostress. The results showed a general NW-SE compression, which is supported on a microscopic scale by the presence of stylolites in a sample of a quartz-rich block showing similar compression direction. The microstructural analysis of calcite veins revealed the presence of three different types of twins, Type I, Type II, and Type III, with Type II being the most dominant twin pattern. In the quartz-rich block, mostly cataclastic deformation is observed, with an extensive network of calcite veins. Some quartz grains are highly strained and show undulose extinction, which indicates high temperature and high stress conditions. This extensive fracturing that probably occurred as a result of the closure of the Maizuru back-arc basin, affected not only the Tonoshiki Formation, which is the topmost unit of the basin, but also the underlying units, namely, the Maizuru Group and the Yakuno ophiolitic basement rocks.

Keywords: Maizuru back-arc basin closure, Tonoshiki breccia, Fracture, Vein, Paleostress

Elucidation of slip characteristics in shallow crustal faults from deformation experiments on sandstone gouges within Himalayan Main Frontal Thrust

*Dyuti Prakash SARKAR[1,2], Takehiro Hirose[2,3]

1. Hiroshima University, 2. HiPeR, 3. KCC JAMSTEC

Faults are structural discontinuities within the rock that range from few centimeters to kilometer- scale, in response to the stress buildup and their eventual release within the rock. The stress release can be instantaneous as is the case of earthquakes or it can be at infinitesimally small rates over the geological timescale that is also called aseismic creep. Therefore, elucidating the deformation mechanisms affecting the development of earthquakes or aseismic creep within rock bodies are a prerequisite in understanding the fault rheology and dynamics. This research focusses on the understanding the controls of constituent mineralogy on the active deformation mechanism and earthquake generation in Himalayas. The mean convergence rate of Himalaya is considered to be ~ 15 mm/year leading to stress accumulation along crustal-scale Main Himalayan Thrust. However, only few stress release events represented by greater than M5+magnitude earthquakes in the Himalayan region have been observed. Hence, elucidating the constraints leading to the disparity in stress accumulation and stress release, is crucial to understand the stress accommodation mechanism and seismicity in the Himalayas. The current active subduction boundary is marked by Main Frontal Thrust separating the sub-Himalayas and the Gangetic alluvial plains. The rock types within the Main Frontal Thrust sheet show two primary types of sandstone protoliths, and three gouge types exhibiting cataclastic to foliated microstructural features. In this study, we have performed rotary-shear velocity step experiments on the powdered samples of the sandstone, as well as the gouge rocks, within the Main Frontal Thrust to determine their frictional properties at slow (10-200 μ m/s; creep) to fast (1.5 m/s; seismic) velocity under 10 MPa effective normal stress condition. We discuss these results and their implications on seismic nucleation in Himalayan Main Frontal Thrust.

Keywords: Main Frontal Thrust, Main Himalayan Thrust, Rotary Shear experiments, seismic nucleation

Handling of the data obtained by quartz Raman barometry

*Yui KOUKETSU[1]

1. Nagoya Univ. Env.

Quartz Raman barometry are used to constrain the metamorphic conditions under which quartz is incorporated into host minerals by Raman spectroscopic analysis of quartz inclusions in host minerals such as garnet and measuring the residual pressure from the peak shift. Quartz Raman barometer have been used to constrain metamorphic conditions by interpreting the quartz that retains the highest residual pressure value as having been incorporated under the peak metamorphic conditions after several data points have been acquired. In reality, however, the residual pressure of quartz inclusions has a wide range of values and may contain a variety of information other than the highest value. In this study, the residual pressure data obtained by the author are used as a basis for the verification of the handling method of the measured data. The quartz inclusions in eclogite collected at Jenner Beach in the Franciscan complex show residual pressure values of 0.15-0.70 GPa, and histograms show a normal distribution with a mean value of 0.51 GPa. On the other hand, when the quartz-containing area was divided into the core, mantle, and rim of the garnet, the mean residual pressure values increased from the core to the rim, with values of 0.43 GPa, 0.54 GPa, and 0.58 GPa, respectively. This result suggests the possibility of clarifying the growth path of prograde not only by integrating all the data and discussing the mean and maximum values, but also by mapping them to the zonal structure of the garnet. On the other hand, quartz eclogite collected in the Gongen area of the Sambagawa Belt shows multiple peaks when histograms are generated, which may reflect a combination of metamorphic conditions at various times. The highest peak at 0.7 GPa is considered to correspond to the peak metamorphic condition of quartz eclogite. On the other hand, the residual pressure peak in the range of 0.4-0.6 GPa on the low pressure side may reflect the timing of garnet growth during progressive metamorphism or reheating in the epidote-amphibolite facies after the eclogite facies. These data suggest that the residual pressure of quartz in garnet reflects various metamorphic conditions, and that careful consideration should be given to the metamorphic history of the rock when using a quartz Raman barometry to constrain the metamorphic conditions.

Keywords: Quartz Raman barometry, Residual pressure, Quartz, Garnet

Oral presentation

R8: Metamorphic rocks and tectonics

Chairperson:Shunsuke Endo, Fumiko Higashino

Fri. Sep 15, 2023 9:00 AM - 12:00 PM 821 (Sugimoto Campus)

10:30 AM - 10:45 AM

[2Lecture-201-11-7add]休憩

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Metagabbro from the Sanbagawa belt in western Shikoku, and its roles in deep underplating of subducting oceanic crust

*Shunsuke ENDO[1], Nachi Kurihara[1], Tomoki Taguchi[2]

1. Shimane University, 2. Waseda University

Keywords: Sanbagawa belt, metagabbro

An approach to understand the mode of formation of titanite microtube texture in Tumbiana formation stromatolite, Pilbara Craton, western Australia

*Kiran SASIDHARAN[1], Yoshihiro Nakamura[2], Satish-Kumar Madhusoodhan[1], Ohfuji Hiroaki[3]

1. Niigata University, 2. Geological Survey of Japan, AIST, 3. Tohoku University

Titanite filled microtubes protruding from healed fractures have been observed in metamorphosed basaltic glass as old as 3.5 Ga (Banerjee et al., 2006). Their rooting in fractures, morphological similarities with modern microtubes, and the in-situ detection of carbonaceous linings were suggested to support a biogenic origin. These titanite microtubes are considered evidence of early life thriving in the oceanic crust during the Archean. However, such titanite microtubes were re-investigated by Lepot et al. (2011) on a pyroclastic tuff in the Tumbiana formation (2.72 Ga) and suggested an abiotic origin by observing the structure, chemistry, and their root zone. In this study, with the help of detailed petrography, mineral chemistry, and EBSD, five morphological types of titanite were observed without any root zone in a stromatolite segment in the Tumbiana Formation, where two types were always associated with carbonaceous material. Raman spectra of these carbonaceous materials correspond to 300 ˚C. The Fe/Al ratio of titanites shows an off-trend to common titanite composition compared to the global occurrences (Kowallis et al., 2022). The EBSD data suggests that the titanites have not been subjected to any deformation and titanites with microtubular texture show an aggregation of grains with distinct crystal orientation. However, coarser irregular titanites have low-angle boundaries with preferred crystal orientation. In addition, the $\delta^{13}C$ value of the carbonaceous material (bulk) in the stromatolite is highly depleted (−39.6 to −47.3 ‰). The possible reasons for the origin of different types of titanites and if any signature for microbial activity is preserved will be discussed in the presentation.

Keywords: Titanite microtubes, Mineral chemistry, EBSD, Stromatolites, Pilbara craton

Morphology and residual elastic stress of coesite within kayanite from the UHP whiteschist of the Southern Dora-Maira Massif

*Nami Takeda[1], Tatsuki Tsujimori[1,2], Tatsuhiko Kawamoto[3], Tetsumaru Itaya[4]

1. Tohoku Univ. Sci, 2. Tohoku Univ. CNEAS, 3. Shizuoka Univ. Sci, 4. jGnet

Keywords: coesite, Raman spectroscopy, UHP metamorphism, whiteschist

On the evaluation of the phengite K-Ar age of the Lawsonite blueschist: Examples from the Horokanai area in the Kamuikotan Belt and the Hakoishi-unit in the Kurosegawa Belt.

*Takao HIRAJIMA[1], Kosuke Naemura[2]

1. Kyoto University, 2. Iwate University

We carry out phengite K-Ar dating of four blueschists containing Lws, Pmp and Ep (Tpriple-point blueschist) in the Horokanai area of the Kamuikotan Belt and obtain two age clusters of 123-127 Ma and 105-109 Ma even for the same grade rocks. In order to evaluate the results, the chemical composition and the degree of chloritization of the phengite, and the grain size and K contents (wt.%) of the separated fractions were examined. Chemical compositions of phengites are Si=3.4-3.6 apfu (O=11) in all four samples, confirming that it was formed under LT/HP metamorphism. On the other hand, the phengite dated at 123-127 Ma was relatively coarse-grained (up to about 1 mm wide) and rare chloritized, and its composition was plotted on the line connecting the muscovite-celadonite join on the Si-Al diagram. In contrast, the phengite dated at 105-109 Ma was fine-grained (<10 μm) and markedly chloritized. On the Si-Al diagram, particles with Si=3.5-3.6 are plotted on the abovementioned line, whereas phengite with Si<3.5 deviates from the line and suggesting that it is mixed with chlorite. Grain size and K contents (wt.%) of the phengite fractions are ranging from 50 to 120 μm and 4.65/4.22wt% for samples dated to 123-127 Ma, and from 0.2 to 2 μm and 1.80/2.71wt% for samples dated to 105-109 Ma. As described above, the phengite fractions that exhibited 105-109 Ma had low mica purity and small grain size. These two factors suggest a rejuvenation of the phengite K-Ar age (Itaya et al., 2011). Sato et al. (2014) reported K-Ar ages for three phengite fractions isolated from two pelitic schists (OD28 and OD113) containing Lws, Na-amphibole and Na-pyroxene in the Kurosegawa Belt, Kyushu, as follows:
OD28: 299 Ma, 50-100 μm, 5.32wt%,
OD113: 280 Ma, 50-75 μm, 1.22wt%,
OD113: 245 Ma, 0.5-2 μm, 2.14wt%,
Based on the results of Sato et al. (2014) and Lu et al. (2022), that fraction size has a significant influence on the rejuvenation of phengite age rather than impurity of phengite.

Keywords: Phengite K-Ar age, Lawsonite blueschist, Reasons for age rejuvenation, Horokanai area, Hakoishi sub-unit

Precipitation of graphite in continental crust from CO_2-rich fluids: Evidence from fluid inclusions, Raman spectroscopy and carbon stable isotopes

*Madhusoodhan SATISH-KUMAR[1], Sasidharan KIRAN[1], Kana UMETSU[1], Sanjeewa MALAVIARACHCHI[2]

1. Niigata University, 2. University of Peradeniya

Carbon, the fourth most abundant element in the solar system, is a key element that controls life, environment and resources. Carbon isotope geochemistry is a widely applied tool for understanding the movement of carbon through different reservoirs in the Earth. Here we present the results of a detailed study on fluid inclusions and Raman spectroscopy of graphite-bearing fluid inclusions and combine them with carbon isotopic compostion in a vein-type graphite occurrence at Kahatagaha mine in Sri Lanka. Graphite occurs in a variety of lithological units in the basement rocks of Sri Lanka (Binu-Lal et al., 2003), however the most spectacular occurrence in Sri Lanka is the vein-type graphite (Touret et al., 2018; Touzain et al., 2010), which is well known for its high purity, high crystallinity, and large reserves. Graphite vein and associated rocks from the Kahatagaha mine were reexamined. Irrespective of various morphological varieties of graphite crystals, the carbon isotope composition of graphite showed only small variation, with an average value of $\delta^{13}C$ = -6.79 +/- 0.42‰ (n=28). All fluid inclusions preserved in quartz pods embedded in graphite vein are pure CO_2, H_2O-CO_2 and H_2O-graphite inclusions. Raman spectroscopy of primary fluid inclusions suggested that the fluid from which the vein-type graphite was precipitated is enriched in CO_2, and the absence of CH_4 indicates no mixing of fluids has occurred. The temperature of graphite precipitation was estimated to be around 500 °C. A comprehensive analysis of carbon isotopic composition and fluid inclusion studies helped to understand the precipitation mechanism of graphite from fluids (e.g. Satish-Kumar, 2005; Touzain et al., 2010) and vein graphite formation in the continental crust.

References: Binu-Lal, S.S., et al. 2003. Chemical Geology 197, 253 –270; Satish-Kumar, M., 2005, Geochimical et Cosmochimica Acta, 69, 3841-3856; Touret, J.L.R., et al. Chemical Geology, 508, 167-181; Touzain, P., et al., 2010. Canadian Mineralogist 48, 1373-1384.

Keywords: Graphite, Fluid inclusions, Carbon isotopes, Raman spectra

Oral presentation

R8: Metamorphic rocks and tectonics

Chairperson:Shunsuke Endo, Fumiko Higashino

Fri. Sep 15, 2023 9:00 AM - 12:00 PM 821 (Sugimoto Campus)

[zoom]Zoom

Zoom

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Oral presentation | R4: Mineral sciences of the Earth surface

Fri. Sep 15, 2023 9:00 AM - 11:30 AM JST | Fri. Sep 15, 2023 12:00 AM - 2:30 AM UTC | 822 Sugimoto Campus

R4: Mineral sciences of the Earth surface

Chairperson:Satoshi Utsunomiya(Kyushu University), Tadashi Yokoyama(Hiroshima University), Jun Kawano(Hokkaido University)

9:00 AM - 9:15 AM JST | 12:00 AM - 12:15 AM UTC

[R4-01] Borehole core analysis of Hiroshima Granite: Depth variation of permeability and porosity and implications for weathering rates

*Tadashi YOKOYAMA[1], Atsuki Yoshida[3], Masahiro Kaibori[2], Ikuo Katayama[1], Kazumasa Tanimoto[1] (1. Hiroshima Univ. Adv. Sci. Eng., 2. Hiroshima Univ. Resilience Research Center, 3. Kyoto Univ.)

9:15 AM - 9:30 AM JST | 12:15 AM - 12:30 AM UTC

[R4-02] Hematite-Goethite Problem on Mars: Transformation of Ferrihydrite to Crystalline Fe Oxides in Salt Solutions

*So Fukaya[1], Keisuke Fukushi[2], Yoshio Takahashi[3] (1. Kanazawa Univ. Sci., 2. Kanazawa Univ., 3. The University of Tokyo)

9:30 AM - 9:45 AM JST | 12:30 AM - 12:45 AM UTC

[R4-03] Band structure of Fe oxides in the Earth surface

*Sayako INOUE[1], Naoki Tarutani[2] (1. Ehime Univ. GRC, 2. Hiroshima Univ. Adv. Sci. Eng,)

9:45 AM - 10:00 AM JST | 12:45 AM - 1:00 AM UTC

[R4-04] Measurement of Exchange Selectivity Coefficients of Interlayer Cations in Smectites and their Raman Spectroscopic Characterization

*Yohei NOJI[1], Keisuke Fukushi[2], yuichiro Cho[3,2], HaHaruhisa Tabata[3] (1. Kanazawa Univ. Sci., 2. Kanazawa Univ., 3. Tokyo Univ.)

10:00 AM - 10:15 AM JST | 1:00 AM - 1:15 AM UTC

[2Lecture-301-09-5add] 休憩

10:15 AM - 10:30 AM JST | 1:15 AM - 1:30 AM UTC

[R4-05] Analysis of the formation process of calcium carbonate polymorphs in gels with the pH visualization technique

Matsumoto Shinji[1], *Jun KAWANO[1], Kousei Miki[1], Takashi Toyofuku[2], Yukiko Nagai[2], Takaya Nagai[1] (1. Hokkaido Univ. Sci., 2. JAMSTEC)

10:30 AM - 10:45 AM JST | 1:30 AM - 1:45 AM UTC

[R4-06] Unique structures and chemical compositions found around the center of fish otoliths

[Presentation award entry]

*Gen Takahashi[1], Taiga Okumura[1], Michio Suzuki [2], Toshihiro Kogure[1] (1. Univ. Tokyo Sci., 2. Univ. Tokyo Agri.)

10:45 AM - 11:00 AM JST | 1:45 AM - 2:00 AM UTC

[R4-07] The color change materials and cause of the coloring of the microbial mats on the surface of the calcareous sinter and the color change materials ~Mineral crystallization and oxidation in microbial mats~

*Miki Suzuki[1], Miku Tatuiwa[2], Terumi Ejima[3], Haruki Yamazaki[4], Hikari Minamisawa[5], Masaomi Horita[5], Maki Hamada[6] (1. Shinshu Univ. Sci., 2. Shinshu Univ. Sci., 3. Shinshu Univ. Sci., GSJ, AIST, 4. Shinshu Univ. Sci., GSJ, AIST, 5. Shinshu Univ. Eng., 6. Kanazawa Univ.)

11:00 AM - 11:15 AM JST | 2:00 AM - 2:15 AM UTC

[R4-08] U(VI) uptake during transformation of monohydrocalcite

*Yumi Morita[1], Keisuke Fukushi[2], Yoshio Takahashi[3] (1. Kanazawa Univ. Sci, 2. Kanazawa Univ., 3. The University of Tokyo)

11:15 AM - 11:30 AM JST | 2:15 AM - 2:30 AM UTC

[R4-09] **Volatilization of B_4C control rods in Fukushima Daiichi nuclear reactors during meltdown: B–Li isotopic signatures in cesium-rich microparticles**

Kazuki Fueda[1], Toshihiko Ohnuki[7], Shinya Yamasaki[2], Kenji Horie[3], Mami Takehara[3], Gareth Law[6], Bernd Grambow[5], Rodney C. Ewing[4], *Satoshi UTSUNOMIYA[1] (1. Kyushu University, 2. Tsukuba Univ., 3. NIPR, 4. Stanford Univ., 5. Univ. Nantes, 6. Univ. Helsinki, 7. TITECH)

[zoom] Zoom

Borehole core analysis of Hiroshima Granite: Depth variation of permeability and porosity and implications for weathering rates

*Tadashi YOKOYAMA[1], Atsuki Yoshida[3], Masahiro Kaibori[2], Ikuo Katayama[1], Kazumasa Tanimoto[1]

1. Hiroshima Univ. Adv. Sci. Eng., 2. Hiroshima Univ. Resilience Research Center, 3. Kyoto Univ.

Keywords: Granite, Permeability, Porosity, Diffusion, Weathering rate

Hematite-Goethite Problem on Mars: Transformation of Ferrihydrite to Crystalline Fe Oxides in Salt Solutions

*So Fukaya[1], Keisuke Fukushi[2], Yoshio Takahashi[3]

1. Kanazawa Univ. Sci., 2. Kanazawa Univ., 3. The University of Tokyo

Keywords: Mars, Hematite, Goethite

Band structure of Fe oxides in the Earth surface

*Sayako INOUE[1], Naoki Tarutani[2]

1. Ehime Univ. GRC, 2. Hiroshima Univ. Adv. Sci. Eng,

Keywords: Fe oxide minerals, band structure, Redox reaction

Measurement of Exchange Selectivity Coefficients of Interlayer Cations in Smectites and their Raman Spectroscopic Characterization

*Yohei NOJI[1], Keisuke Fukushi[2], yuichiro Cho[3,2], HaHaruhisa Tabata[3]

1. Kanazawa Univ. Sci., 2. Kanazawa Univ., 3. Tokyo Univ.

Keywords: Smectite

Oral presentation

R4: Mineral sciences of the Earth surface

Chairperson:Satoshi Utsunomiya(Kyushu University), Tadashi Yokoyama(Hiroshima University), Jun Kawano(Hokkaido University)

Fri. Sep 15, 2023 9:00 AM - 11:30 AM 822 (Sugimoto Campus)

10:00 AM - 10:15 AM

[2Lecture-301-09-5add]休憩

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Analysis of the formation process of calcium carbonate polymorphs in gels with the pH visualization technique

Matsumoto Shinji[1], *Jun KAWANO[1], Kousei Miki[1], Takashi Toyofuku[2], Yukiko Nagai[2], Takaya Nagai[1]

1. Hokkaido Univ. Sci., 2. JAMSTEC

Keywords: calcium carbonate, pH, visualization

Unique structures and chemical compositions found around the center of fish otoliths

*Gen Takahashi[1], Taiga Okumura[1], Michio Suzuki [2], Toshihiro Kogure[1]

1. Univ. Tokyo Sci., 2. Univ. Tokyo Agri.

Otoliths, which form in the inner ear of fish, are thought to serve as sensors detecting tilt, acceleration, and sound, made of a block of calcium carbonate ($CaCO_3$). In general, teleost fish have three types of otoliths known as lapillus, sagitta, and asteriscus. The lapillus and sagitta are made of aragonite and the asteriscus is made of vaterite. However, it remains unclear how these polymorphs are selected. In this study, each otolith in the initial formation phase of juvenile fish are collected and the structure and chemical composition near the center of the otolith, which is the starting point for crystal growth, were analyzed by transmission electron microscopes to elucidate the polymorph selection mechanism in fish otoliths.
As samples, lapillus, sagitta, and asteriscus, each about 20 to 50 μm in diameter, were collected from juvenile goldfish (*Carassius auratus*), thin films containing their centers were prepared by focused ion beam and observed with transmission electron microscopes. As a result, in the center of the lapillus and sagitta, a structure in which multiple spherical substances had aggregated was observed (Figures 1, 2) and electron diffraction patterns explainable by single-crystal calcite are obtained from them. Around these substances, fine aragonite crystals were growing radially. On the other hand, the center of the asteriscus contained a mixture of a low-density substance (probably organic) and almost single-crystal vaterite (Figure 3), and the crystals growing around it were mosaic crystals of vaterite with roughly the same orientation as this. Furthermore, an energy-dispersive X-ray detector mounted on a scanning transmission electron microscope was used to examine the elemental distribution in the centers of these otoliths. In the lapillus and sagitta, Mn was localized in the spherical substances and F was localized around them (Figures 4, 5), while in the asteriscus, almost no Mn was detected, and only F was localized (Figure 6). Thus, the structure and chemical composition near the center of the otoliths are completely different between aragonite lapillus and sagitta and vaterite asteriscus, suggesting that the selection of these polymorphs may be due to the differences in the substances that serve as the starting point of the crystal.

Keywords: biomineralization, calcium carbonate, vaterite, polymorph, TEM

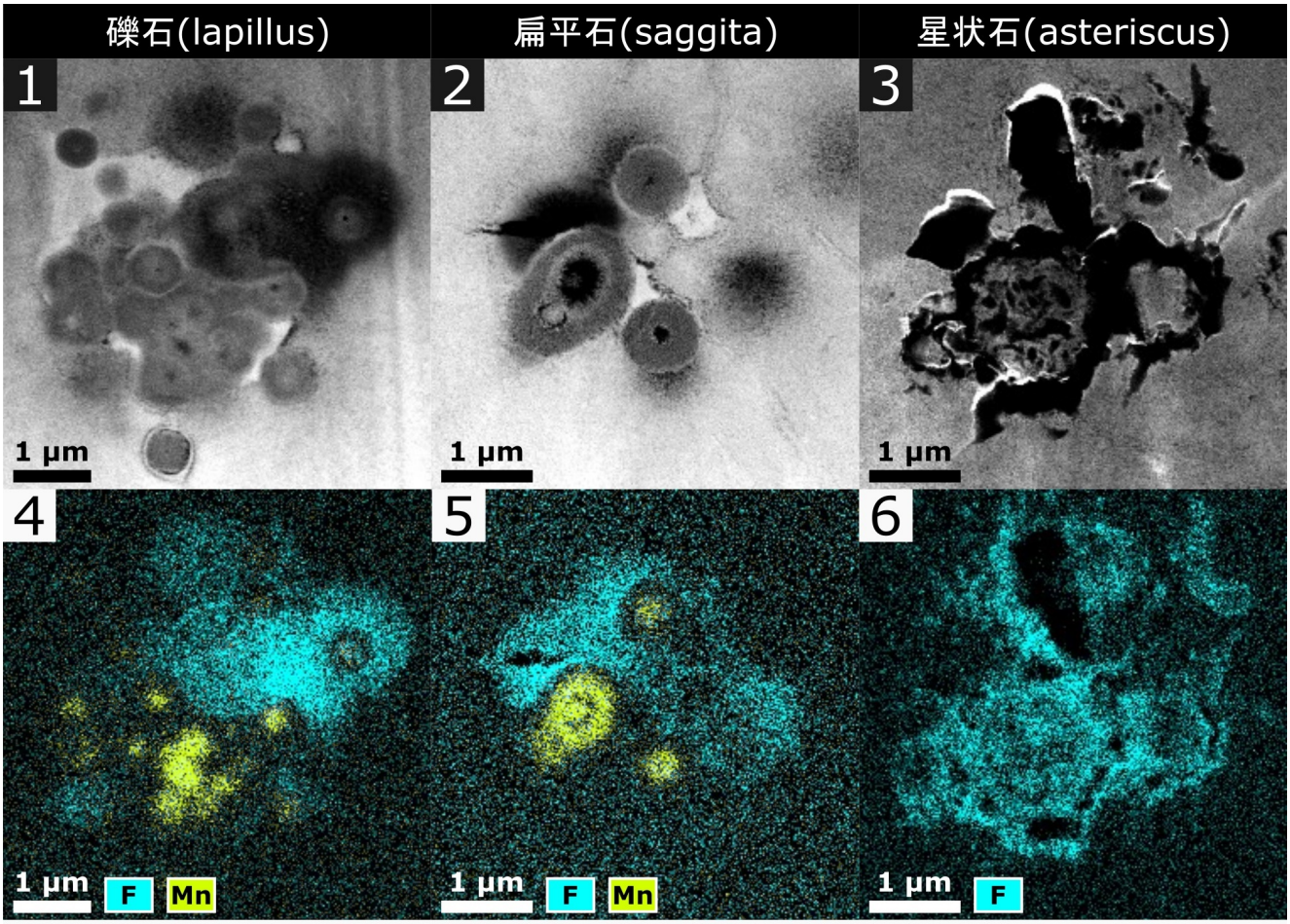


図. 各耳石の中心近傍の HAADF-STEM 像及び F と Mn の分布
Fig. HAADF-STEM image of the center of each otolith, and the distribution of F and Mn

The color change materials and cause of the coloring of the microbial mats on the surface of the calcareous sinter and the color change materials
~Mineral crystallization and oxidation in microbial mats~

*Miki Suzuki[1], Miku Tatuiwa[2], Terumi Ejima[3], Haruki Yamazaki[4], Hikari Minamisawa[5], Masaomi Horita[5], Maki Hamada[6]

1. Shinshu Univ. Sci., 2. Shinshu Univ. Sci., 3. Shinshu Univ. Sci., GSJ, AIST, 4. Shinshu Univ. Sci., GSJ, AIST, 5. Shinshu Univ. Eng., 6. Kanazawa Univ.

The Microbial mats(biomats) on the calcareous sinter from Shirahone Hot Springs turn purple, red-purple and light blue with the passage of time from the time of collection. The purpose of this study is to clarify the cause of the coloring of the biomats on the surface of the calcareous sinter and the color change process with the time. The study methods are observation and chemical analysis of the purple-colored biomats using field emission electron microprobe analyzer (FE-EPMA) and transmission electron microscope (TEM). The results of progress observation showed that the samples stored in a vacuum changed in color more slowly than those stored in the air. From the analytical results, the purple biomats were contain a small amount of Fe as transition metal element and found to contain fine particles of about 10 nm in diameter containing Fe and P. Based on the constituent elements of the fine particles and the characteristics of color change due to oxidation, the fine particles are presumed to be vivianite. It has been known that the color of vivianite is changed by oxidation in the air (e.g. McCammon and Burns, 1980). Since the color of the sample stored in a vacuum changes more slowly than that stored in the air, it is evident that vivianite particles, formed by Fe^{2+} taken up by bacteria and P, changed its color by oxidation in the air over time. Vivianite is usually colorless and transparent, and changes in color to dark blue, dark patina, indigo blue, blue, and black with the oxidation (e.g. McCommon and Burns, 1980; Anthony et al., 2005), but the samples in the biomats in this study are characterized by purple, red-purple and light blue discoloration. It is considered that the vivianite in the present study is particles of the nano order and the color of the aggregate is different from the characteristic color of the macroscopic crystal.

Keywords: biomats, vivianite, shirahone hot spring

U(VI) uptake during transformation of monohydrocalcite

*Yumi Morita[1], Keisuke Fukushi[2], Yoshio Takahashi[3]

1. Kanazawa Univ. Sci, 2. Kanazawa Univ., 3. The University of Tokyo

Keywords: monohydrocalcite, uranium, coprecipitation

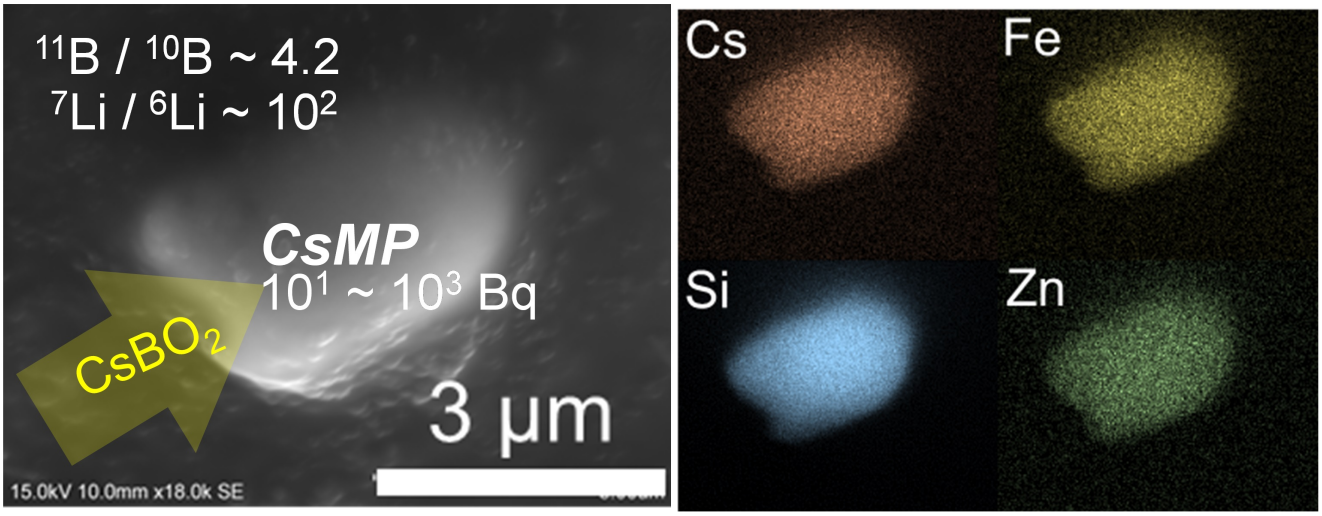
Volatilization of B_4C control rods in Fukushima Daiichi nuclear reactors during meltdown: B–Li isotopic signatures in cesium-rich microparticles

Kazuki Fueda[1], Toshihiko Ohnuki[7], Shinya Yamasaki[2], Kenji Horie[3], Mami Takehara[3], Gareth Law[6], Bernd Grambow[5], Rodney C. Ewing[4], *Satoshi UTSUNOMIYA[1]

1. Kyushu University, 2. Tsukuba Univ., 3. NIPR, 4. Stanford Univ., 5. Univ. Nantes, 6. Univ. Helsinki, 7. TITECH

Boron carbide control rods remain in the fuel debris of the damaged reactors in the Fukushima Daiichi Nuclear Power Plant, potentially preventing re-criticality; however, the state and stability of the control rods remain unknown. Sensitive high-resolution ion microprobe analyses have revealed B–Li isotopic signatures in radioactive Cs-rich microparticles (CsMPs) that formed by volatilization and condensation of Si-oxides during the meltdowns. The CsMPs contain 1518–6733 mg kg^{-1} of $^{10+11}B$ and 11.99–1213 mg kg^{-1} of ^{7}Li. The $^{11}B/^{10}B$ (4.15–4.21) and $^{7}Li/^{6}Li$ (213–406) isotopic ratios are greater than natural abundances (~4.05 and ~12.5, respectively), indicating that $^{10}B(n,\alpha)^{7}Li$ reactions occurred in B_4C prior to the meltdowns. The total amount of B released with CsMPs was estimated to be 0.024–62 g, suggesting that essentially all B remains in reactor Units 2 and/or 3 and is enough to prevent re-criticality; however, the heterogeneous distribution of B needs to be considered during decommissioning.

Keywords: Fukushima Daiichi, Cesium-rich microparticles (CsMPs), Boron isotope, Control rod, Secondary ion mass spectrometry



Oral presentation

R4: Mineral sciences of the Earth surface

Chairperson:Satoshi Utsunomiya(Kyushu University), Tadashi Yokoyama(Hiroshima University), Jun Kawano(Hokkaido University)

Fri. Sep 15, 2023 9:00 AM - 11:30 AM 822 (Sugimoto Campus)

[zoom]Zoom

Zoom

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Oral presentation | S1: Dynamics of igneous processes (Special Session)

Sat. Sep 16, 2023 9:00 AM - 10:00 AM JST | Sat. Sep 16, 2023 12:00 AM - 1:00 AM UTC | 820 Sugimoto Campus

S1: Dynamics of igneous processes (Special Session)

Chairperson:Morihisa Hamada(JAMSTEC), Shumpei Yoshimura(Hokkaido University)

9:00 AM - 9:15 AM JST | 12:00 AM - 12:15 AM UTC

[S1-01] Dehydration and heating processes during magma transportation decoded from chemical zonings in peridotite xenolith from Ichinomegata, NE Japan

*Yuto SATO[1], Eiichi Takahashi[1], Kazuhito Ozawa[2] (1. GIGCAS, 2. AORI, Univ. Tokyo)

9:15 AM - 9:30 AM JST | 12:15 AM - 12:30 AM UTC

[S1-02] **Post-entrapment density modification of fluid inclusions by elastic deformation: Implications for fluid inclusion geobarometry of peridotites**

*Yuuki HAGIWARA[1], Ross John Angel[2], Junji Yamamoto[3], Rosario Esposito[4], Matteo Alvaro[5] (1. JAMSTEC, 2. IGG-CNR, 3. Kyushu University, 4. University of Milano-Bicocca, 5. University of Pavia)

9:30 AM - 9:45 AM JST | 12:30 AM - 12:45 AM UTC

[S1-03] Textural and chemical changes of alkali feldspar during disequilibrium melting of granite

*Hiroshi KAWABATA[1], Shigeru YAMASHITA[2] (1. Kochi University, 2. Okayama University)

9:45 AM - 10:00 AM JST | 12:45 AM - 1:00 AM UTC

[S1-04] Experimental simulation of crystallite and spherulite in rhyolitic lava

*Tamotsu Sugawara[1], Shumpei Yoshimura[1] (1. Hokkaido Univ. Sci.)

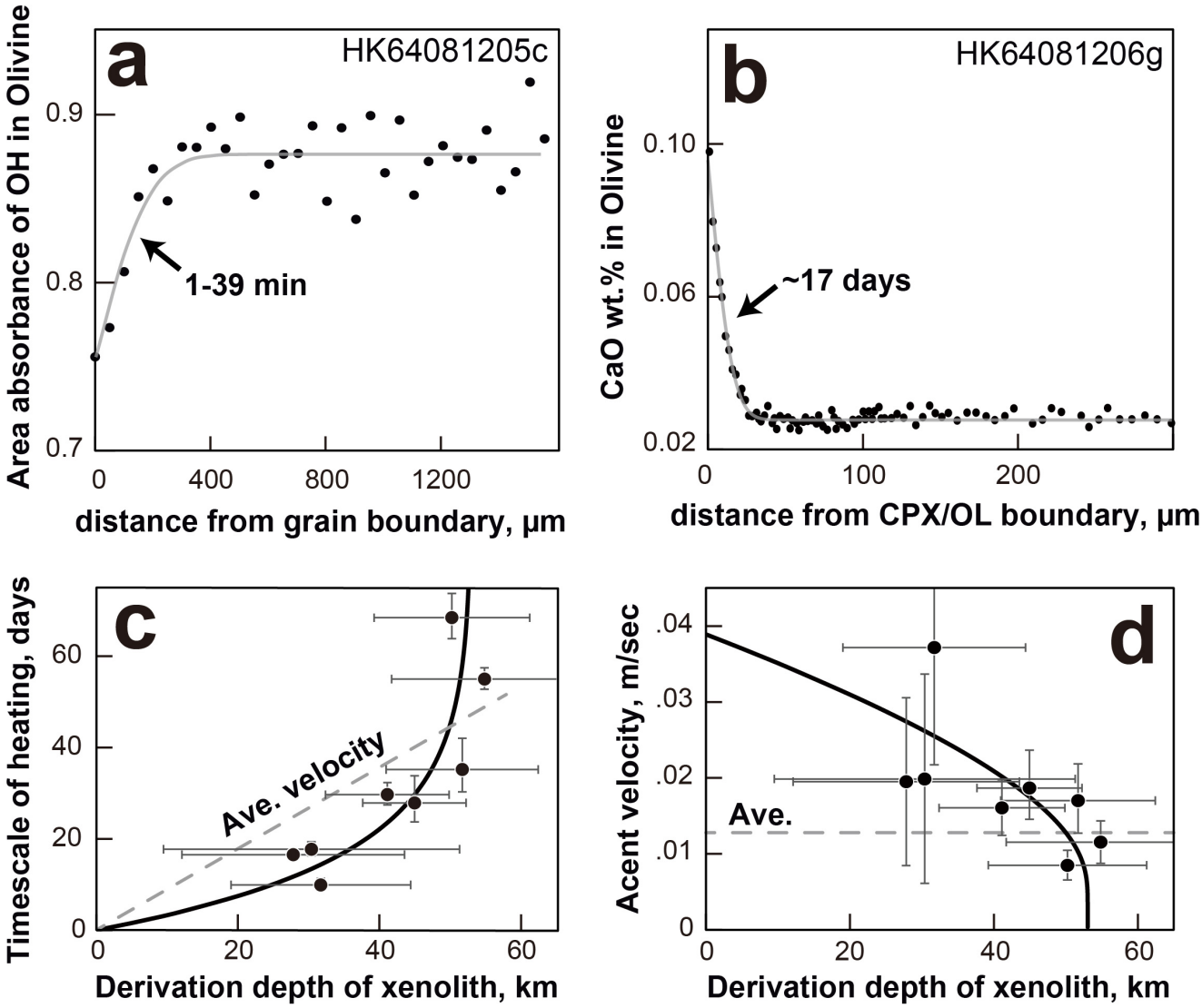
[zoom] Zoom

Dehydration and heating processes during magma transportation decoded from chemical zonings in peridotite xenolith from Ichinomegata, NE Japan

*Yuto SATO[1], Eiichi Takahashi[1], Kazuhito Ozawa[2]

1. GIGCAS, 2. AORI, Univ. Tokyo

Keywords: mantle xenolith, magma transportation, chemical zoning, water content, olivine



Post-entrapment density modification of fluid inclusions by elastic deformation: Implications for fluid inclusion geobarometry of peridotites

*Yuuki HAGIWARA[1], Ross John Angel[2], Junji Yamamoto[3], Rosario Esposito[4], Matteo Alvaro[5]

1. JAMSTEC, 2. IGG-CNR, 3. Kyushu University, 4. University of Milano-Bicocca, 5. University of Pavia

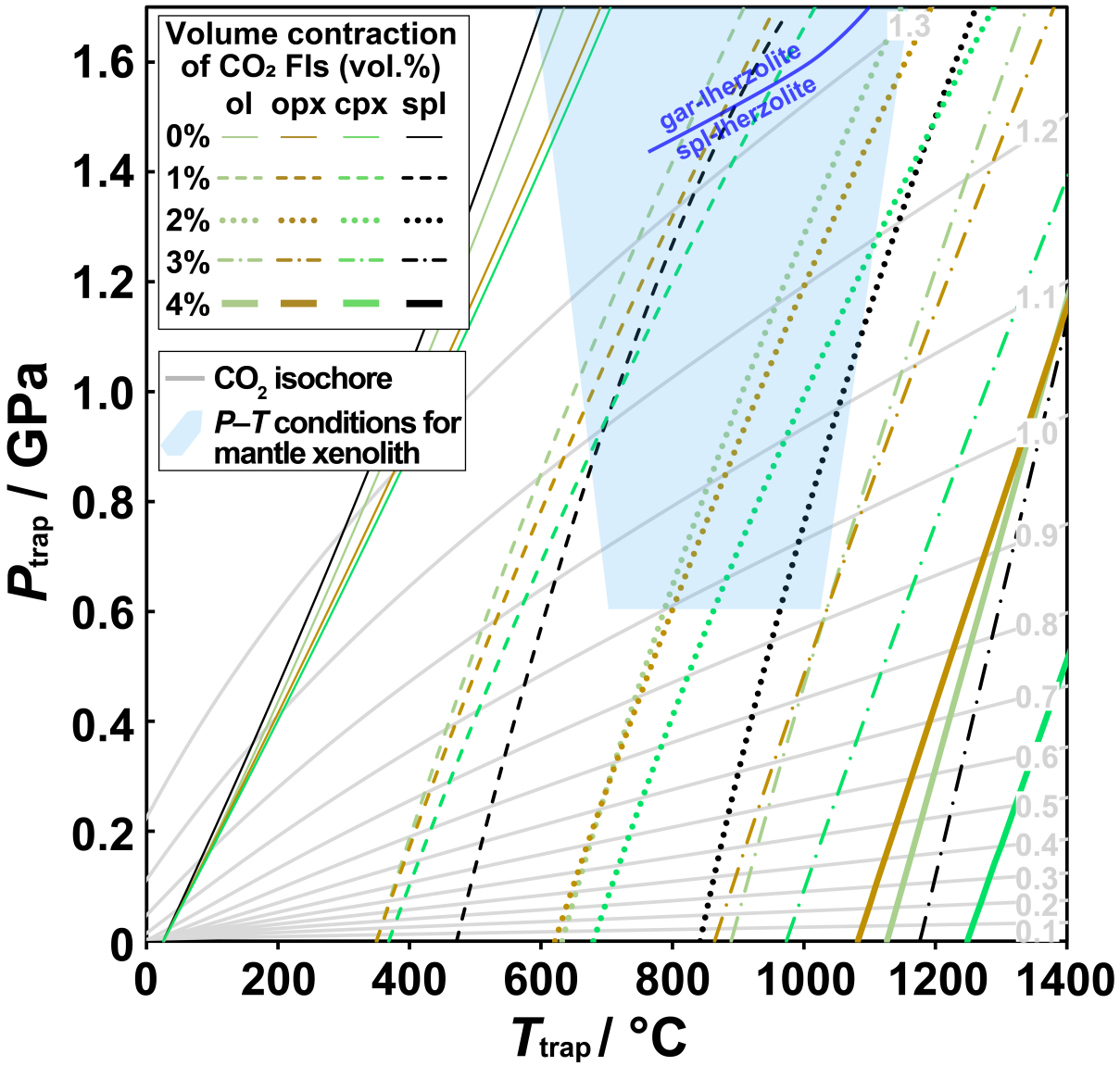
Changes in fluid inclusion (FI) density (ρ_{inc}) due to elastic deformation of the host mineral have long been recognized as a possible source of systematic error in the estimation of trapping pressures by FI geobarometry (e.g., Ermakov 1950), but it has been difficult to accurately assess the effect of elastic deformation on ρ_{inc}. However, recent improvements in elastic geobarometry theory (e.g., Angel et al. 2014; 2017) and equations of state of host minerals (e.g., Angel et al. 2018; Hagiwara et al. 2022) have allowed us to accurately assess the uncertainty that elastic deformation brings to FI geobarometry. Here, we evaluate the influence of elastic deformation on the estimation of the depth provenance by FI geobarometry, using peridotites as examples, and propose a correction method.

We show that, due to elastic deformation, the measured ρ_{inc} of FI trapped under typical *P-T* conditions of spinel-lherzolites are about 0–3% greater than the density at the *P-T* conditions of entrapment. Therefore, unless the effects of elastic deformation are corrected, trapping pressures will be slightly overestimated. Our results also demonstrate that differences in the elastic properties of the host minerals do not play any role in the widely reported mineral species dependence of measured ρ_{inc} (i.e., spinel > opx ~ cpx > olivine) in peridotites. Furthermore, it was also demonstrated that fluid density change by laser heating (Hagiwara et al. 2021a; 2021b) and cation ordering of spinel (Hagiwara et al. 2022) cannot explain this mineral species dependence. These results mean that ρ_{inc} of FIs in olivine, orthopyroxene, and clinopyroxene are reduced by factors other than elastic deformation because it is unlikely that any mechanism other than elastic deformation or cation ordering can increase the ρ_{inc}. Therefore, P_{trap} estimated using the FIs in spinel should be closer to the true entrapment pressures than those obtained from FIs in olivine, orthopyroxene, and clinopyroxene.

References

Angel et al. (2014) *Am Mineral*, **99**, 2146-2149; Angel et al. (2017) *Am Mineral*, **102**, 1957-1960; Angel et al. (2018) *Phys Chem Miner*, **45**, 95-113; Ermakov (1950) University of Kharkov Press, 460 pp.; Hagiwara et al. (2021a) *J. Raman Spectros.* **52**, 1744–1757; Hagiwara et al. (2021b) *Chem. Geol.* **559**, 119928; Hagiwara et al. (2022) *Contrib. Min. Petrol.* **177**

Keywords: Fluid inclusion, Geobarometry, Equation of state, Elastic deformation, Raman spectroscopy



トラップ条件(P_{trap}とT_{trap})から標準状態(0 GPaと25°C)まで*P-T*が低下する過程でolivine, opx, cpx, spinel中のCO_2流体包有物の体積が0, 1, 2, 3, 4%減少する等積変化線. 青い領域はマントル捕獲岩の典型的な由来P-T領域である(Hasterok & Chapman 2011). 灰色の曲線はCO_2の等密度線である(Pitzer and Sterner 1994).

Textural and chemical changes of alkali feldspar during disequilibrium melting of granite

*Hiroshi KAWABATA[1], Shigeru YAMASHITA[2]

1. Kochi University, 2. Okayama University

Keywords: Alkali feldspar, Disequilibrium melting

Experimental simulation of crystallite and spherulite in rhyolitic lava

*Tamotsu Sugawara[1], Shumpei Yoshimura[1]

1. Hokkaido Univ. Sci.

Keywords: Crystallization, Rhyolite, Spherulite, Crystallite

Oral presentation

S1: Dynamics of igneous processes (Special Session)

Chairperson:Morihisa Hamada(JAMSTEC), Shumpei Yoshimura(Hokkaido University)

Sat. Sep 16, 2023 9:00 AM - 10:00 AM 820 (Sugimoto Campus)

[zoom]Zoom

Zoom

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Oral presentation | R5: Extraterrestrial materials

Sat. Sep 16, 2023 9:00 AM - 12:00 PM JST | Sat. Sep 16, 2023 12:00 AM - 3:00 AM UTC | 821 Sugimoto Campus

R5: Extraterrestrial materials

Chairperson:Megumi Matsumoto, Daiki Yamamoto, Yusuke Seto, Shogo Tahibana

9:00 AM - 9:15 AM JST | 12:00 AM - 12:15 AM UTC

[R5-01] Shock deformation microstructures in rutile

*Yuhei Umeda[1], Yuma Nagai[1], Naotaka Tomioka[2], Toshimori Sekine[3], Masashi Miyakawa[4], Takamichi Kobayashi[4], Hitoshi Yusa[4], Takuo Okuchi[1] (1. Kyoto Univ. KURNS., 2. JAMSTEC, 3. HPSTAR, 4. NIMS)

9:15 AM - 9:30 AM JST | 12:15 AM - 12:30 AM UTC

[R5-02] Microstructures of calcite deformed by 3-D shock experiments

*Naotaka TOMIOKA[1], Kosuke Kurosawa[2], Haruka Ono[3], Takafumi Niihara[4], Takafumi Matsui[2] (1. KOCHI, JAMSTEC, 2. PERC, Chiba Inst. Tech., 3. Res. Org. Sci. Tech., Ritsumeikan Univ., 4. Dept App. Sci., Okayama Sci. Univ.)

9:30 AM - 9:45 AM JST | 12:30 AM - 12:45 AM UTC

[R5-03] FIB-TEM observation of silica minerals coexisting in achondrites

*Atsushi TAKENOUCHI[1], Youhei Igami[2], Akira Miyake[2], Haruka Ono[3], Takashi Mikouchi[4], Akira Yamaguchi[5] (1. The Kyoto Univ. Museum, 2. Kyoto Univ., 3. Ritsumeikan Univ., 4. The Univ. Museum, The Univ. of Tokyo, 5. Natl. Inst. of Polar Res.)

9:45 AM - 10:00 AM JST | 12:45 AM - 1:00 AM UTC

[R5-04] Assessment of Shock Melting of Martian Meteorites as Deduced from Short Time Heating Experiments of Basalt and Martian Soil Simulants

[Presentation award entry]

*Takeru Sato[1], Takashi Mikouchi[2] (1. Univ. of Tokyo, 2. Univ. of Tokyo)

10:00 AM - 10:15 AM JST | 1:00 AM - 1:15 AM UTC

[R5-05] Observation of internal structure of diamond in carbon grains in DaG 999 ureilite.

*Masahiro YASUTAKE[1], Megumi Matsumoto[3], Junya Matsuno[2], Akira Tsuchiyama[2,4], Kentaro Uesugi[1], Akihisa Takeuchi[1] (1. JASRI, 2. Ritsumeikan Univ., 3. Tohoku Univ., 4. CAS/GIG)

10:15 AM - 10:30 AM JST | 1:15 AM - 1:30 AM UTC

[3Lecture-201-11-6add] 休憩

10:45 AM - 11:00 AM JST | 1:45 AM - 2:00 AM UTC

[R5-07] Nano-CT and TEM analysis of impact melt splashes and microcraters on asteroid Ryugu samples

*Megumi MATSUMOTO[1], Junya Matsuno[2], Akira Tsuchiyama[2,3], Tomoki Nakamura[1], Yuma Enokido[1], Mizuha Kikuiri[1], Masahiro Yasutake[4], Kentaro Uesugi[4], Akihisa Takeuchi[4], Satomi Enju[5], Shota Okumura[6], Itaru Mitsukawa[6], Sun Mingqi[3], Akira Miyake[6], Hayabusa2 initial analysis core-team (1. Tohoku Univ., 2. Ritsumeikan Univ., 3. GIG, CAS, 4. JASRI, 5. Ehime Univ., 6. Kyoto Univ.)

11:00 AM - 11:15 AM JST | 2:00 AM - 2:15 AM UTC

[R5-08] Origins of olivine grains in CI chondrites and asteroid Ryugu samples as inferred from their major and minor element compositions

*Takashi MIKOUCHI[1], Hideto Yoshida[1], Minami Masuda[1], Michael E. Zolensky[2] (1. Univ. of Tokyo, 2. NASA/JSC)

11:15 AM - 11:30 AM JST | 2:15 AM - 2:30 AM UTC

[R5-09] On the relationship between modal abundances of minerals and degrees of aqueous alteration of the brecciated fragments in the Orgueil CI chondrite

*Minami Masuda[1], Takashi Mikouchi[2], Michael Zolensky[3] (1. UTokyo Sci., 2. UTokyo UMUT/Sci., 3. NASA JSC)

11:30 AM - 11:45 AM JST | 2:30 AM - 2:45 AM UTC

[R5-10] Mineralogical diversity of the C1 lithologies in the Kaidun meteorite

[Presentation award entry]

*Kenei OGIYA[1], Takashi Mikouchi[2], Michael E Zolensky[3] (1. Univ. of Tokyo, 2. Univ. of Tokyo , 3. NASA)

11:45 AM - 12:00 PM JST | 2:45 AM - 3:00 AM UTC

[R5-11] Classification of subtype 3.0 chondrites

*Makoto Kimura[1], Michale K. Weisberg[2], Akira Yamaguchi[1] (1. National Institute of Polar Rsearch, 2. City University of New York)

[zoom] Zoom

Shock deformation microstructures in rutile

*Yuhei Umeda[1], Yuma Nagai[1], Naotaka Tomioka[2], Toshimori Sekine[3], Masashi Miyakawa[4], Takamichi Kobayashi[4], Hitoshi Yusa[4], Takuo Okuchi[1]

1. Kyoto Univ. KURNS., 2. JAMSTEC, 3. HPSTAR, 4. NIMS

Shock response of minerals is an essential clue for understanding of deformation properties of rocks during natural impact events in the history of Earth and planets. Shock-compression experiments are the primary method for simulating such deformation process. Shock recovery experiments using a single-stage propellant were conducted for single crystal and powdered rutile to investigate the effect of heating related to porosity on the shock-induced deformation microstructures. X-ray diffraction (XRD) and transmission electron microscopy (TEM) analyses of the shocked single crystal rutile revealed that a high-density of stacking fault occurred on the (101) plane. The defect suggests that the dominant slip system in the plastic deformation of the crystal is {101}<01>. A part of the crystal is intergrown with the α-PbO_2 structure in a topotaxial relationship: $[010]_{Rt}$ // $[001]_{\alpha\text{-}PbO2}$. Based on topological analysis, the single crystal rutile would have transformed to the α-PbO_2 structure via the calcium-fluoride structure concomitantly with shear deformation. Meanwhile, the shocked powdered rutile consists mainly of particles with pervasive entangled dislocations and recrystallized particles, where the α-PbO_2 structure did not occur at all. Considering the absence of stacking faults, a possible dominant slip system in the shocked powdered rutile is {110}[001].

Keywords: Rutile, Shock recovery experiment, Deformation, Defect

Microstructures of calcite deformed by 3-D shock experiments

*Naotaka TOMIOKA[1], Kosuke Kurosawa[2], Haruka Ono[3], Takafumi Niihara[4], Takafumi Matsui[2]

1. KOCHI, JAMSTEC, 2. PERC, Chiba Inst. Tech., 3. Res. Org. Sci. Tech., Ritsumeikan Univ., 4. Dept App. Sci., Okayama Sci. Univ.

Keywords: Calcite, Shock experiments, Dislocations, Transmission electron microscopy

FIB-TEM observation of silica minerals coexisting in achondrites

*Atsushi TAKENOUCHI[1], Youhei Igami[2], Akira Miyake[2], Haruka Ono[3], Takashi Mikouchi[4], Akira Yamaguchi[5]

1. The Kyoto Univ. Museum, 2. Kyoto Univ., 3. Ritsumeikan Univ., 4. The Univ. Museum, The Univ. of Tokyo, 5. Natl. Inst. of Polar Res.

Keywords: silica, achondrites, phase transition, thermal history, tridymite

Assessment of Shock Melting of Martian Meteorites as Deduced from Short Time Heating Experiments of Basalt and Martian Soil Simulants

*Takeru Sato[1], Takashi Mikouchi[2]

1. Univ. of Tokyo, 2. Univ. of Tokyo

Keywords: Martian Meteorite, Shergottite, Heating Experiment, Regolith, Maskelynite

表 1 JSC Mars-1 を用いた加熱実験の結果

	10秒	30秒	1分	5分	10分	60分
1300度	△	○	○	-	-	◎
1200度	△	△	○	-	-	◎
1150度	△	△	△	○	○	○
1125度	△	△	△	-	-	○
1100度	-	-	-	-	-	△

◎：ほとんど(~90%)が溶融、○：少量(~10%)が溶融、△：わずかに(~5%)溶融

Observation of internal structure of diamond in carbon grains in DaG 999 ureilite.

*Masahiro YASUTAKE[1], Megumi Matsumoto[3], Junya Matsuno[2], Akira Tsuchiyama[2,4], Kentaro Uesugi[1], Akihisa Takeuchi[1]

1. JASRI, 2. Ritsumeikan Univ., 3. Tohoku Univ., 4. CAS/GIG

Keywords: SR-CT, mateorite, ureilite, diamond, graphite

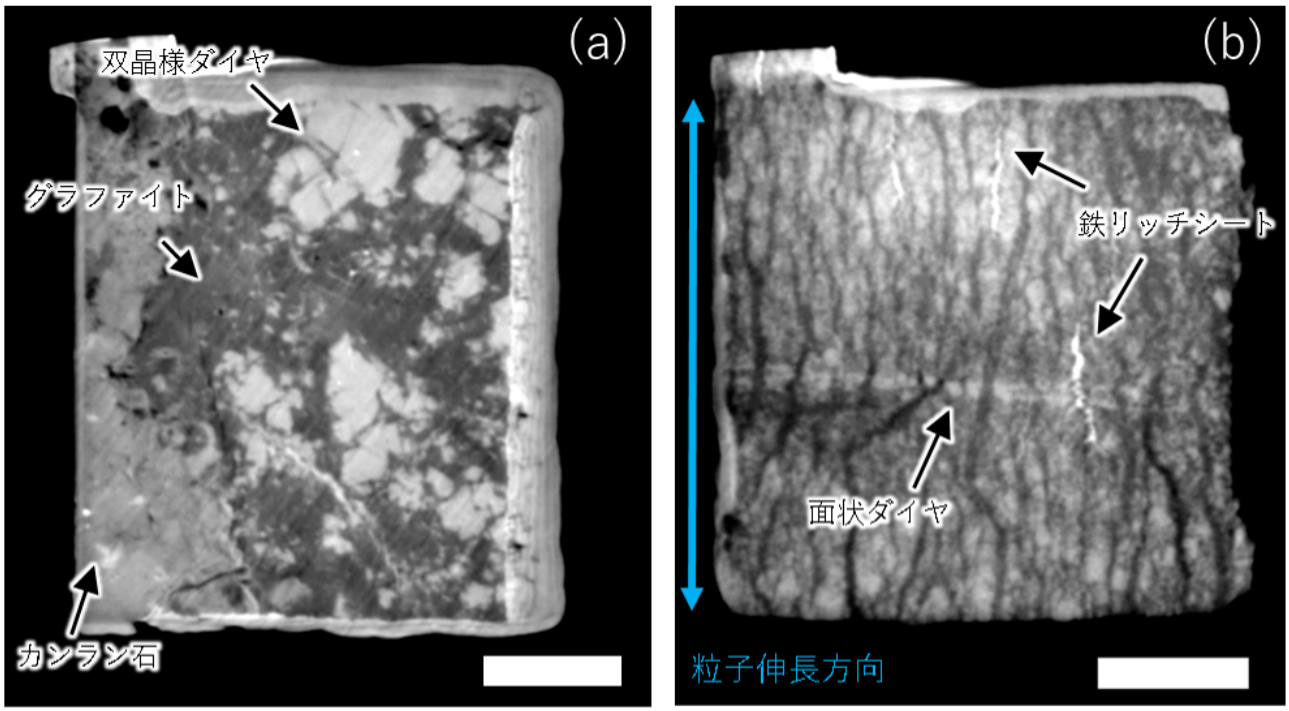


図1. 炭素粒子のCT断面像. （a）粒子2の位相像. グラファイト中にマイクロダイヤが囲まれるように産する. 図上部には双晶様に産するダイヤが見られる. （b）粒子3の位相像. 試料全体に粒子伸長方向（紙面上下）と平行な層構造が発達している。また、特徴的に鉄に富むシートが含まれる. 図中央には層構造とほぼ直行方向（紙面左右）に面状のダイヤと思われるものが分布する. この構造上下方向の層構造に切られている事が分かる. 図中スケールバーは10μm.

Oral presentation

R5: Extraterrestrial materials

Chairperson:Megumi Matsumoto, Daiki Yamamoto, Yusuke Seto, Shogo Tahibana

Sat. Sep 16, 2023 9:00 AM - 12:00 PM 821 (Sugimoto Campus)

10:15 AM - 10:30 AM

[3Lecture-201-11-6add]休憩

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Nano-CT and TEM analysis of impact melt splashes and microcraters on asteroid Ryugu samples

*Megumi MATSUMOTO[1], Junya Matsuno[2], Akira Tsuchiyama[2,3], Tomoki Nakamura[1], Yuma Enokido[1], Mizuha Kikuiri[1], Masahiro Yasutake[4], Kentaro Uesugi[4], Akihisa Takeuchi[4], Satomi Enju[5], Shota Okumura[6], Itaru Mitsukawa[6], Sun Mingqi[3], Akira Miyake[6], Hayabusa2 initial analysis core-team

1. Tohoku Univ., 2. Ritsumeikan Univ., 3. GIG, CAS, 4. JASRI, 5. Ehime Univ., 6. Kyoto Univ.

Keywords: asteroid (162173) Ryugu, micrometeoroid impact, impact melt splash

Origins of olivine grains in CI chondrites and asteroid Ryugu samples as inferred from their major and minor element compositions

*Takashi MIKOUCHI[1], Hideto Yoshida[1], Minami Masuda[1], Michael E. Zolensky[2]

1. Univ. of Tokyo, 2. NASA/JSC

Keywords: CI chondrite, Asteroid Ryugu, Olivine, Amoeboid olivine aggregat (AOA), Chondrule

On the relationship between modal abundances of minerals and degrees of aqueous alteration of the brecciated fragments in the Orgueil CI chondrite

*Minami Masuda[1], Takashi Mikouchi[2], Michael Zolensky[3]

1. UTokyo Sci., 2. UTokyo UMUT/Sci., 3. NASA JSC

Keywords: CI chondrite, Orgueil meteorite, modal abundance

	Org小1_01	Org小1_02	Org小1_03	Org小1_04	Org小2_01	Org小2_02	Org小2_03	Org小2_04	Org小2_05	Org小2_06
層状ケイ酸塩	96.32	95.43	93.82	93.90	94.10	95.53	94.44	99.11	96.50	92.62
マグネタイト	1.56	3.73	3.66	2.78	2.43	3.96	2.85	0.89	2.30	6.61
硫化鉄	1.69	0.07	0.14	0.13	0.15	0.26	0.05	—	—	0.12
ドロマイト	0.33	0.54	1.79	3.19	1.66	0.21	2.53	—	0.89	0.64
ブリューネライト	—	—	—	—	—	—	—	—	—	—
Ca炭酸塩	—	—	—	—	—	—	—	—	—	—
Caリン酸塩	0.10	0.21	0.59	0.00	1.66	0.04	0.14	—	0.31	0.01
カンラン石、輝石	—	0.03	—	—	—	—	—	—	—	—

Org小2_07	Org小2_08	Org小2_09	Org小3_01	Org小3_02	Org小3_03	Org小3_04	Org小3_05	Org小3_06	Org小3_07	Org小3_08
93.29	98.08	95.50	95.87	99.10	96.63	96.66	97.10	96.70	96.65	98.45
2.83	1.85	2.68	3.15	0.83	1.82	2.67	2.05	3.11	1.40	1.10
0.02	—	1.06	0.01	—	0.02	0.00	0.01	—	—	—
3.72	0.07	0.72	0.92	—	1.15	0.41	0.44	0.14	0.43	0.41
—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—
0.13	—	0.04	0.04	—	0.39	0.26	0.40	0.05	—	—
—	—	—	0.01	0.07	—	—	—	—	1.52	0.04

Org大_00	Org大_01	Org大_04	Org大_17	Org大_18	Org大_21	Org大_26	Org大_30	Org大_31	Org大_33	Org大_35	Org大_36
92.96	95.37	91.43	94.44	90.34	90.06	94.93	96.16	93.12	92.56	92.79	92.74
6.76	4.63	7.49	5.02	7.82	9.04	4.48	3.44	6.26	6.46	6.56	6.69
0.04	—	—	—	—	0.05	0.59	0.45	0.46	—	0.33	0.31
0.28	—	1.08	0.55	1.84	0.90	0.59	0.40	0.62	0.98	0.66	0.58
—	—	—	—	—	—	—	—	—	—	—	—
0.05	—	—	—	—	—	—	—	—	0.06	—	—
—	—	—	—	—	—	—	0.04	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—

表 1

Mineralogical diversity of the C1 lithologies in the Kaidun meteorite

*Kenei OGIYA[1], Takashi Mikouchi[2], Michael E Zolensky[3]

1. Univ. of Tokyo, 2. Univ. of Tokyo , 3. NASA

Keywords: Carbonaceous chondrite, Aqueous alteration, Petrological type 1, Carbonate minerals, Iron sulfides

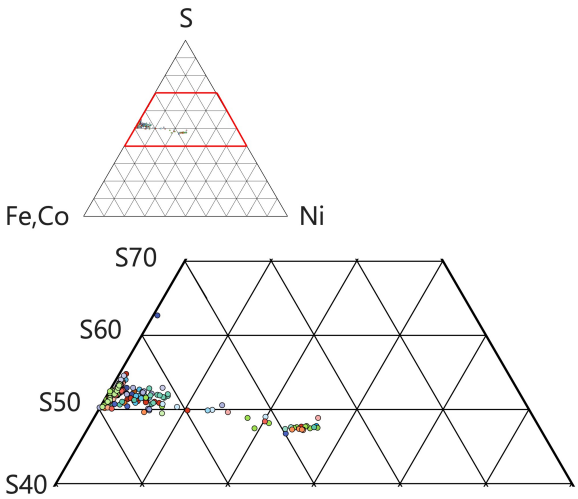


図1
38個のKaidun C1岩片における鉄硫化物組成

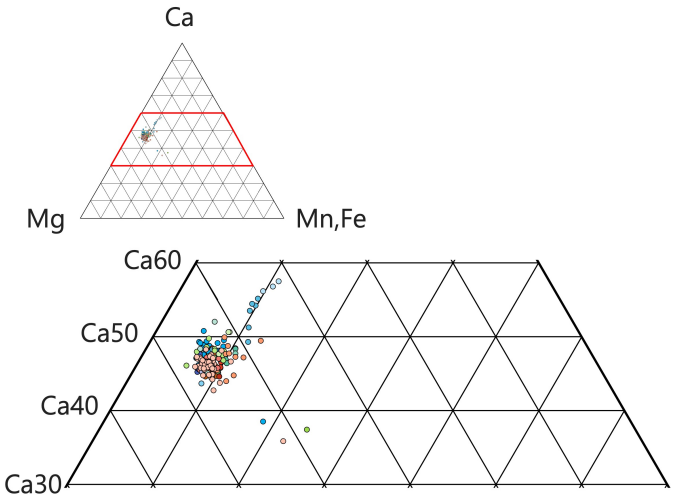


図 2
21個のKaidun C1岩片におけるdolomite組成

Classification of subtype 3.0 chondrites

*Makoto Kimura[1], Michale K. Weisberg[2], Akira Yamaguchi[1]

1. National Institute of Polar Rsearch, 2. City University of New York

Type 3 chondrites are subdivided into 3.0 to 3.9. Subtype 3.0 chondrites nearly preserve all of their primitive features. Many criteria have been proposed to distinguish such primitive chondrites. Here we compiled mineral data and reconsider the classification criteria for subtype 3.0.

Keywords: Chondrite, Classification

Oral presentation

R5: Extraterrestrial materials

Chairperson:Megumi Matsumoto, Daiki Yamamoto, Yusuke Seto, Shogo Tahibana

Sat. Sep 16, 2023 9:00 AM - 12:00 PM 821 (Sugimoto Campus)

[zoom]Zoom

Zoom

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Oral presentation | R3: High-pressure science and deep Earth's material

Sat. Sep 16, 2023 9:00 AM - 12:00 PM JST | Sat. Sep 16, 2023 12:00 AM - 3:00 AM UTC | 822 Sugimoto Campus

R3: High-pressure science and deep Earth's material

Chairperson:Takaaki Kawazoe(Hiroshima University), Takeshi Sakai(Ehime University), Masayuki Nishi(Osaka University)

9:00 AM - 9:15 AM JST | 12:00 AM - 12:15 AM UTC

[R3-01] First-principles investigations of the polysomatism of antigorite under pressure

*Jun TSUCHIYA[1], Sayako Inoue[1], Taiga Mizoguchi[1] (1. Ehime University)

9:15 AM - 9:30 AM JST | 12:15 AM - 12:30 AM UTC

[R3-02] The change in the hydrous mechanism of enstatite with Al incorporation

*Moe Sakurai[1], Hiroshi Sakuma[2], Noriyoshi Tsujino[3], Eiichi Takahashi[4], Katsuyuki Kawamura[5] (1. Okayama Univ., 2. NIMS, 3. JASRI, 4. GIG, CAS, 5. Tokyo Tech.)

9:30 AM - 9:45 AM JST | 12:30 AM - 12:45 AM UTC

[R3-03] H and Al incorporation mechanisms in stishovite: New insights from multi-nuclear NMR and first-principles calculation

*Xianyu XUE[1], Masami Kanzaki[1] (1. Okayama University)

9:45 AM - 10:00 AM JST | 12:45 AM - 1:00 AM UTC

[R3-04] Influence of high oxygen fugacity on melting temperature of wadsleyite and chemical composition of the generated melts

[Presentation award entry]

*Kazutaka YAMAGUCHI[1], Takaaki Kawazoe[1], Toru Inoue[1], Takeshi Sakai[2] (1. Hiroshima Univ. Adv, 2. Ehime Univ. Geodynamics)

10:00 AM - 10:15 AM JST | 1:00 AM - 1:15 AM UTC

[R3-05] Anoisotropic electrical resistivity in $FeTiO_3$ ilmenite, compressibility and spin state under high pressure.

*Takamitsu YAMANAKA[1] (1. Chinese HPSTAR)

10:15 AM - 10:30 AM JST | 1:15 AM - 1:30 AM UTC

[R3-06] Melting relations at the mantle transition zone to uppermost lower mantle in the MgO-SiO_2-H_2O system

*Toru INOUE[1], Kota OKUMURA[1], Takaaki KAWAZOE[1], Sho KAKIZAWA[2], Masamichi NODA[3], Tetsuo IRIFUNE[4], Toru SHINMEI[4] (1. Hiroshima Univ.y, 2. JASRI, 3. Delaware State Univ., 4. Ehime Univ. GRC)

10:30 AM - 10:45 AM JST | 1:30 AM - 1:45 AM UTC

[3Lecture-301-11-7add] 休憩

10:45 AM - 11:00 AM JST | 1:45 AM - 2:00 AM UTC

[R3-07] **Water content profile of magma in the mantle transition zone predicted from high-pressure, high-temperature experiments**

[Presentation award entry]

*Yusuke Egi[1], Toru Inoue[1], Kota Okumura[1], Takaaki Kawazoe[1] (1. Hiroshima Univ. Sci.)

11:00 AM - 11:15 AM JST | 2:00 AM - 2:15 AM UTC

[R3-08] Elastic anomaly at the spin transition in ferropericlase: Revisited by GHz-DAC Ultrasonic Velocity Measurement newly developed

*Takuto Kato[1], Akira Yoneda[1], Tadashi Kondo[1], Daisuke Yamazaki[2] (1. Osaka Univ. Sci., 2. Okayama. IPM)

11:15 AM - 11:30 AM JST | 2:15 AM - 2:30 AM UTC

[R3-09] Iron-Water Exchange at the Earth's Core-Mantle Boundary

[Presentation award entry]

*Katsutoshi Kawano[1], Masayuki Nishi[1], Sho Kakizawa[2], Toru Inoue[3], Hideharu Kuwahara[4], Tadashi Kondo[1] (1. Osaka Univ. Sci, 2. JASRI, 3. Hiroshima Univ. Sci, 4. Ehime Univ. GRC)

11:30 AM - 11:45 AM JST | 2:30 AM - 2:45 AM UTC

[R3-10] Increase of hydrogen-induced volume expansion by incorporation of Si into iron and the effect in estimated hydrogen content in the Earth’s core

[Presentation award entry]

*Yuichiro MORI[1], Hiroyuki Kagi[1], Katsutoshi Aoki[1], Masahiro Takano[1], Sho Kakizawa[2], Asami Sano[3], Ken-ichi Funakshi[4] (1. UTokyo, 2. JASRI, 3. J-PARC Center, JAEA, 4. CROSS)

11:45 AM - 12:00 PM JST | 2:45 AM - 3:00 AM UTC

[R3-11] Post-spinel transition of Fe_2SiO_4 ahrensite at high pressure and high temperature

*Masaki AKAOGI[1,2], Natsuki MIYAZAKI[1], Taisuke TAJIMA[1], Hiroshi KOJITANI[1] (1. Gakushuin Univ. Sci. , 2. Univ. Tokyo Sci.)

[zoom] Zoom

First-principles investigations of the polysomatism of antigorite under pressure

*Jun TSUCHIYA[1], Sayako Inoue[1], Taiga Mizoguchi[1]

1. Ehime University

Serpentine is hydrous phyllosilicate known to be formed in the mantle wedge by a reaction between mantle peridotie and upwelling water released by the decomposition of hydrous minerals in the subducting slab [e.g. Schmidt and Poli,1998]. Partially serpentinized peridotite may be a significant reservoir of water in the mantle wedge and the dehydration of serpentine is considered to have an important contribution to the generation of arc magmatism. This was also extensively investigated in connection with intermediate and deep earthquakes [e.g. Irifune et al. , 1996].
In order to investigate the transporting processes of water into the Earth’ s interior, the thermodynamic stabilities and the elastic properties of antigorite should be clarified. Antigorite is the high-temperature polymorph of serpentine and thus the relevant phase in the subduction zone. This phase has been reported to show polysomatism depending on the pressure and temperature conditions. Previous TEM study reported that *m* value (*m* = number of SiO_4 tetrahedra in a wavelength along the a axis) increases/decreases with pressure/temperature [e.g. Wunder et al. 2001]. However, there is no sufficient structural and thermodynamic corroboration regarding the stable polysome of antigorite along the pressure and temperature conditions of the subducting oceanic plate.
In the present study, we investigated the structure and elasticity of antigorite with several different *m* values by ab intio calculation and discuss the stable polysome of antigorite in the subducting oceanic plate.

Keywords: ab initio calculation, antigorite

The change in the hydrous mechanism of enstatite with Al incorporation

*Moe Sakurai[1], Hiroshi Sakuma[2], Noriyoshi Tsujino[3], Eiichi Takahashi[4], Katsuyuki Kawamura[5]

1. Okayama Univ., 2. NIMS, 3. JASRI, 4. GIG, CAS, 5. Tokyo Tech.

Keywords: Hydrous mechanism, DFT calculation, FT-IR

H and Al incorporation mechanisms in stishovite: New insights from multi-nuclear NMR and first-principles calculation

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1. Okayama University

Aluminous stishovite has been recognized as an important water carrier in subducted oceanic basalts, and may be responsible for some observed seismic anomalies. In order to constrain how the incorporation of H and Al in stishovite affects its physical properties, it is important to understand how these elements are incorporated in the crystal structure. Previous studies generally reported that the H/Al ratios in stishovite are significantly below unity, requiring both coupled Al+H substitution for Si and excess Al accompanied by oxygen vacancies. However, there have been little direct supporting evidences for the proposed substitution mechanisms. In this study, we performed a comprehensive ^{1}H MAS and static NMR, ^{27}Al MAS and 3QMAS NMR, ^{1}H-^{29}Si and ^{1}H-^{27}Si CPMAS NMR study on a hydrous aluminous stishovite sample, which was first described in Xue et al. (2006) Am Mineral 91, 850-861, and synthesized from a nominal bulk composition of 0.95SiO_2.0.05AlOOH at 18 GPa and 1800˚C. NMR measurements were made using a Bruker Avance NEO 400 spectrometer. We also performed first-principles calculation with the GIPAW method using the Quantum-ESPRESSO package (v.7.0) on various optimized model structures containing coupled Al+H substitution for Si and substitution of 2Al+1O vacancy for 2Si to help interpretation. It was found that the sample consists of a hydrous aluminous stishovite phase containing about 0.3 wt% H2O, coexisting with Al_2O_3 corundum. The stishovite phase yields a ^{1}H MAS NMR peak near 9.4 ppm, a ^{1}H-^{29}Si CPMAS NMR peak near -191 ppm with a weak shoulder toward less negative chemical shift, attributable to octahedral Si, and a ^{1}H-^{27}Al CPMAS NMR peak with a maximum near 1.9 ppm, attributable to octahedral Al. The main features of all the observed NMR spectra are consistent with first-principles calculation results for coupled Al-H substitution for Si. No four- or five- coordinated Si or Al, which should occur if the substitution mechanism of 2Al+O vacancy for 2Si operates, were revealed, although expected to be observable (e.g., calculated C_Q^{Al} around 6.0~9.4 MHz for Al^{V}). This study thus casted doubt on the general validity of views held thus far about H and Al incorporation mechanisms in stishovite. Raman and EPMA analyses are also under planning, and the latest results will be presented at the meeting.

Keywords: water, stishovite, NMR, first-principles calcualtion, aluminum

Influence of high oxygen fugacity on melting temperature of wadsleyite and chemical composition of the generated melts

*Kazutaka YAMAGUCHI[1], Takaaki Kawazoe[1], Toru Inoue[1], Takeshi Sakai[2]

1. Hiroshima Univ. Adv, 2. Ehime Univ. Geodynamics

Keywords: Wadsleyite, Ferric iron, Oxygen fugacity, Melting temperature, Mantle transition zone

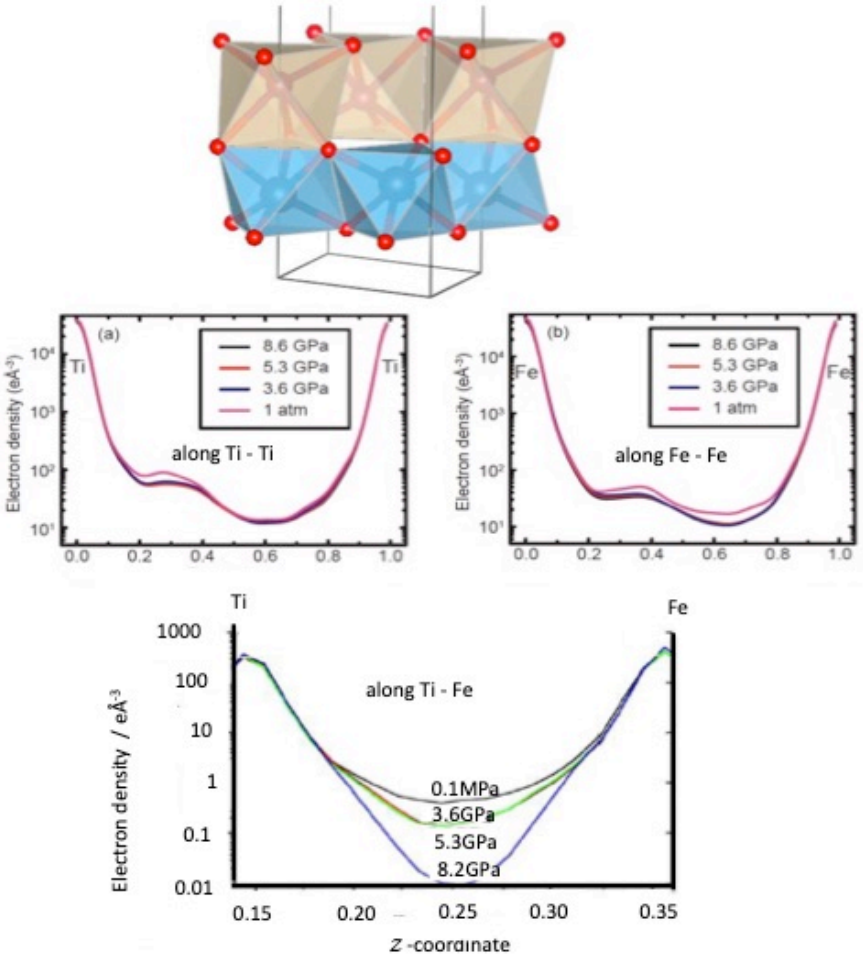
Anoisotropic electrical resistivity in $FeTiO_3$ ilmenite, compressibility and spin state under high pressure.

*Takamitsu YAMANAKA[1]

1. Chinese HPSTAR

Neutron and synchrotron X-ray diffraction experiments perform precise analysis of the $FeTiO_3$ ilmenite structure. $FeTiO_3$does neither transform into perovskite nor $LiNbO_3$ structure phase under pressures up to 28 GPa. However, different compression curves of both FeO_6 and TiO_6 octahedra are observed below 8 GPa. FeO_6 is more compressive and flexible than TiO_6. TiO_6 octahedron is an extremely rigid body. Pressure dependence of electrical resistivity using single crystal proves that $FeTiO_3$ ilmenite shows an anisotropic electrical conductivity. The resistivity in the direction perpendicular to the *c*-axis decreases monotonously with increasing pressure. On the other hand the resistivity parallel to the *c*-axis shows the hallow-shape of the curvature. In three Fe-Fe, Ti-Ti and Fe-Ti atomic distances, the shortest Fe-Ti distance presents the highest electrical conduction and electron mobility of $Fe^{2+}Ti^{4+}$ and $Fe^{3+}Ti^{3+}$ by electron super exchange during compression between adjacent Fe and Ti cations.The electron localization around Fe and Ti atoms is clarified by maximum entropy measurement calculation. Electron configuration of Fe^{2+} ($3d^6$) is more strongly changed than Ti^{4+} ($3d^0$) under compression. The electron configuration of the former cation is related to the revolution of Jahn-Teller effect in the ligand field of C_{3v} molecular symmetry. The anisotropic electrical conductivity and non-uniform structure change of Fe-Ti interatomic distance can be explained by the possible spin transition. The spin transition of Fe*Kb* from high-spin state to intermediate-spin state is possible in the electronic state change of $FeTiO_3$.

Keywords: FeTiO3 ilmenita, high-pressure neutron diffraction, electrical resistivity measurement, anisotropic electron super exchange, electron radial distribution


(a)
8.6 GPa
5.3 GPa
3.6 GPa
1 atm
Ti
Ti
along Ti - Ti
Electron density (eÅ⁻³)
(b)
Fe
Fe
along Fe - Fe
Ti
Fe
along Ti - Fe
0.1MPa
3.6GPa
5.3GPa
8.2GPa
Electron density / eÅ⁻³
Z -coordinate

Melting relations at the mantle transition zone to uppermost lower mantle in the MgO-SiO_2-H_2O system

*Toru INOUE[1], Kota OKUMURA[1], Takaaki KAWAZOE[1], Sho KAKIZAWA[2], Masamichi NODA[3], Tetsuo IRIFUNE[4], Toru SHINMEI[4]

1. Hiroshima Univ.y, 2. JASRI, 3. Delaware State Univ., 4. Ehime Univ. GRC

Keywords: MgO-SiO2-H2O system, Melting relations, mantle transition zone, lower mantle , hydrous magma

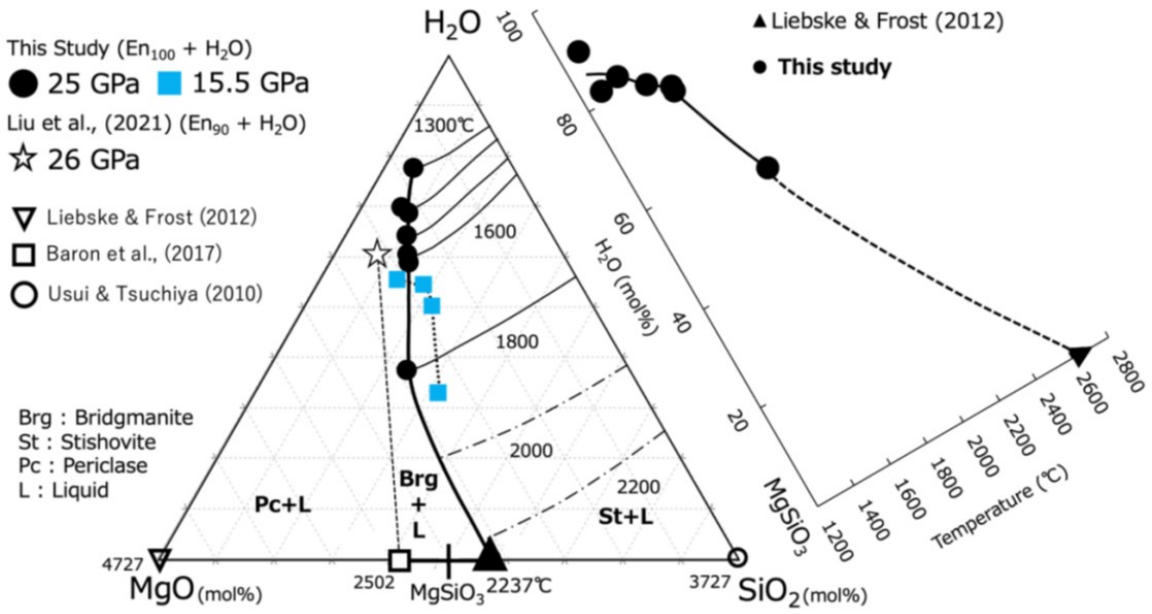


図 1. MgO-SiO_2-H_2O 系における共融線（15.5 GPa (点線) , 25 GPa (太線) 。細線は等温線。（Brg : Bridgmanite , St : Stishovite , Pc : Periclase , L : Liquid）

Oral presentation

R3: High-pressure science and deep Earth’ s material

Chairperson:Takaaki Kawazoe(Hiroshima University), Takeshi Sakai(Ehime University), Masayuki Nishi(Osaka University)

Sat. Sep 16, 2023 9:00 AM - 12:00 PM 822 (Sugimoto Campus)

10:30 AM - 10:45 AM

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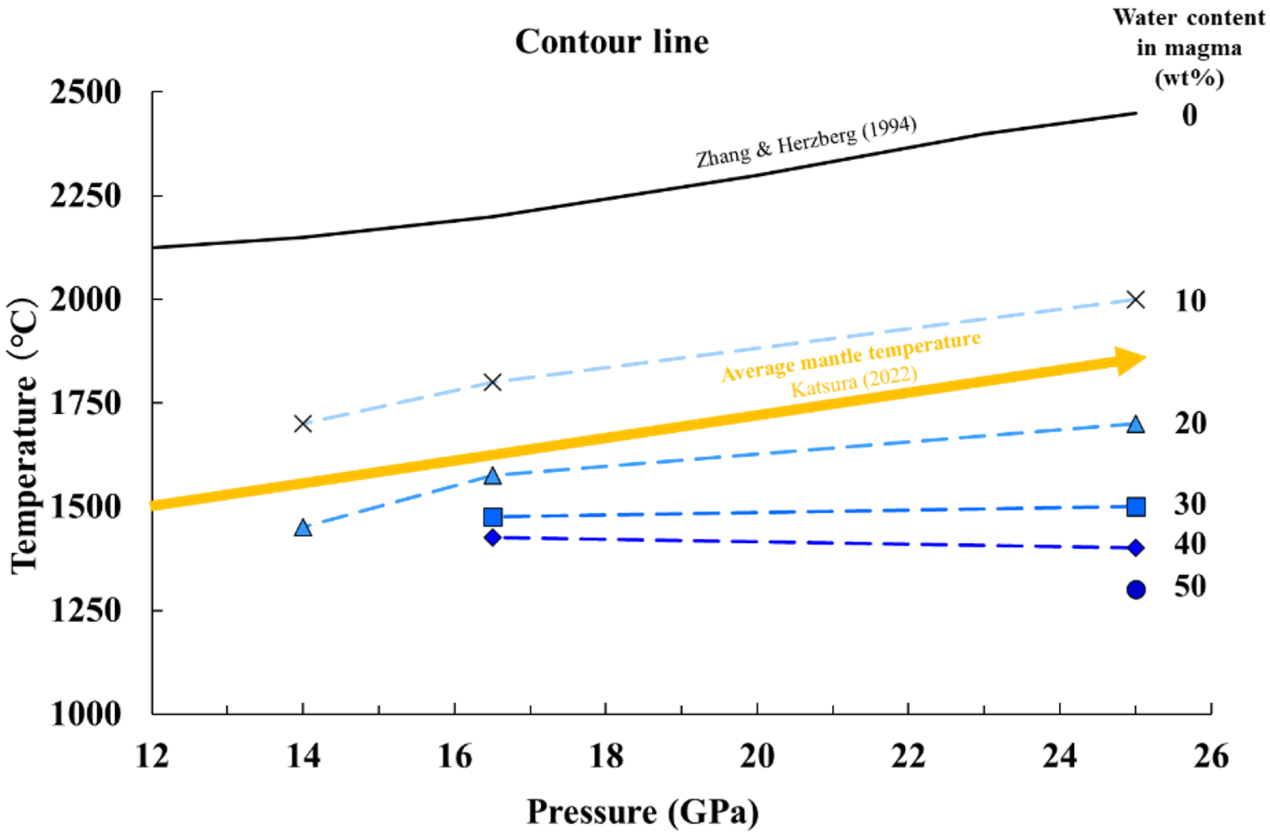
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Water content profile of magma in the mantle transition zone predicted from high-pressure, high-temperature experiments

*Yusuke Egi[1], Toru Inoue[1], Kota Okumura[1], Takaaki Kawazoe[1]

1. Hiroshima Univ. Sci.

Keywords: Water content in magma



図：各温度圧力で生成する含水マグマの等含水量線↵

Elastic anomaly at the spin transition in ferropericlase: Revisited by GHz-DAC Ultrasonic Velocity Measurement newly developed

*Takuto Kato[1], Akira Yoneda[1], Tadashi Kondo[1], Daisuke Yamazaki[2]

1. Osaka Univ. Sci., 2. Okayama. IPM

Keywords: Ferropericlase, Spin transition, GHz method, Diamond Anvil Cell

Iron-Water Exchange at the Earth's Core-Mantle Boundary

*Katsutoshi Kawano[1], Masayuki Nishi[1], Sho Kakizawa[2], Toru Inoue[3], Hideharu Kuwahara[4], Tadashi Kondo[1]

1. Osaka Univ. Sci, 2. JASRI, 3. Hiroshima Univ. Sci, 4. Ehime Univ. GRC

Keywords: ultralow velocity zones, multi-anvil apparatus experiment, bridgmanite, ferropericlase, water

Increase of hydrogen-induced volume expansion by incorporation of Si into iron and the effect in estimated hydrogen content in the Earth’ s core

*Yuichiro MORI[1], Hiroyuki Kagi[1], Katsutoshi Aoki[1], Masahiro Takano[1], Sho Kakizawa[2], Asami Sano[3], Ken-ichi Funakshi[4]

1. UTokyo, 2. JASRI, 3. J-PARC Center, JAEA, 4. CROSS

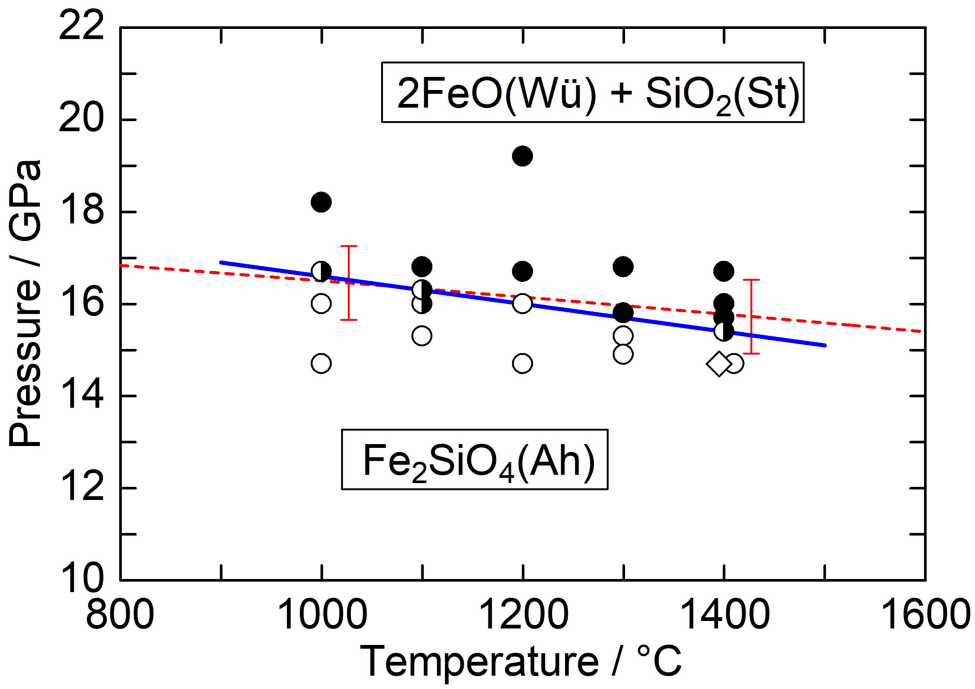
Keywords: High-pressure experiments, Neutron diffraction, Light element in the core, Hydrogen, Silicon

Post-spinel transition of Fe_2SiO_4 ahrensite at high pressure and high temperature

*Masaki AKAOGI[1,2], Natsuki MIYAZAKI[1], Taisuke TAJIMA[1], Hiroshi KOJITANI[1]

1. Gakushuin Univ. Sci. , 2. Univ. Tokyo Sci.

Keywords: Post-spinel transition , ahrensite, high-pressure experiment, thermodynamic calculation



Oral presentation

R3: High-pressure science and deep Earth’ s material

Chairperson:Takaaki Kawazoe(Hiroshima University), Takeshi Sakai(Ehime University), Masayuki Nishi(Osaka University)

Sat. Sep 16, 2023 9:00 AM - 12:00 PM 822 (Sugimoto Campus)

[zoom]Zoom

Zoom

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Oral presentation | R6: Plutonic rocks, volcanic rocks and subduction factory

Sat. Sep 16, 2023 10:15 AM - 12:00 PM JST | Sat. Sep 16, 2023 1:15 AM - 3:00 AM UTC | 820 Sugimoto Campus

R6: Plutonic rocks, volcanic rocks and subduction factory

Chairperson:Takashi Yuguchi, Atsushi Kamei

10:15 AM - 10:30 AM JST | 1:15 AM - 1:30 AM UTC

[R6-01] Igneous activity formed meta-granitoid in the Tenmondai rocks of the Lützow-Holm complex, East Antarctica

*Atsushi KAMEI[1], Momo Ichikawa[1], Tomokazu Hokada[2], Kenichiro Tani[3], Ippei Kitano[4], Sotaro Baba[5], Nugroho I. Setiawan[6], Prayath Nantasin[7], Davaa-ochir Dashbaatar[8], Yoichi Motoyoshi[2] (1. Shimane University, 2. National Institute of Polar Research, 3. National Museum of Nature and Science, 4. Hokkaido University, 5. University of the Ryukyus, 6. Universitas Gadjah Mada, 7. Kasetsart University, 8. Mongolian University of Science and Technology)

10:30 AM - 10:45 AM JST | 1:30 AM - 1:45 AM UTC

[R6-02] Mafic veins in the mantle section recovered during Oman Drilling Project: products of backarc spreading?

*Yuji ICHIYAMA[1], Hisatoshi Ito[2], Akihiro Tamura[3], Tomoaki Morishita[3] (1. Chiba University, 2. Central Research Institute of ElectricPower Industry, 3. Kanazawa University)

10:45 AM - 11:00 AM JST | 1:45 AM - 2:00 AM UTC

[R6-03] Muographic study of the oceanic crust-mantle density structure of the Oman Ophiolite

*Susumu UMINO[1], Hiroyuki Tanaka[2], László Oláh[2], Dezső Varga[4], Tomoaki Morishita[1], Yoshihiro Hiramatsu[1], Yuki Kusano[3] (1. Kanazawa University, 2. University of Tokyo, 3. AIST, 4. Wigner Research Center for Physics)

11:00 AM - 11:15 AM JST | 2:00 AM - 2:15 AM UTC

[R6-04] Magma genesis of the Iwafune diorites, Ibaraki Prefecture

[Presentation award entry]

*Haruki YAMAZAKI[1,2], Terumi EJIMA[1,2], Yoshiaki KON[2] (1. Shinshu Univ. Sci., 2. GSJ, AIST)

11:15 AM - 11:30 AM JST | 2:15 AM - 2:30 AM UTC

[R6-05] Zircon U-Pb age combined with trace element geochemistry constraining the source of Miocene granitoids of the Kagoshima Prefecture, Japan

*Hafiz Ur REHMAN[1], Marimo NAKABAYASHI[1], Yuki OTA[1], Kaushik DAS[2], Chung Sun LIN[3], Hao YANG LEE[3], Daisuke YAMASHITA[4], Hiroshi YAMAMOTO[1] (1. Kagoshima Uni., 2. Hiroshima Uni., 3. IES, Academia Sinica, Taiwan, 4. Satsumasendai Kosh. Mus.)

11:30 AM - 11:45 AM JST | 2:30 AM - 2:45 AM UTC

[R6-06] Chronological re-examination of the Kanmon Group, Southwest Japan: and remaining unsolved problems

*Yukiyasu TSUTSUMI[1], Ryo Hasegawa[2], Yukio Isozaki[3] (1. National Museum of Nature and Science, 2. FUJIFILM Business Innovation Corp., 3. Graduate school of Arts and Sciences, University of Tokyo)

11:45 AM - 12:00 PM JST | 2:45 AM - 3:00 AM UTC

[R6-07] U-Pb zircon age of granitoids in the Aoyama area, Ryoke belt, SW Japan

*Fumiko HIGASHINO[1], Tetsuo KAWAKAMI[1], Shuhei SAKATA[2], Shunpei Kudo[1], Yohei IGAMI[1] (1. Kyoto Univ. Sci., 2. Univ. Tokyo)

[zoom] Zoom

Igneous activity formed meta-granitoid in the Tenmondai rocks of the Lützow-Holm complex, East Antarctica

*Atsushi KAMEI[1], Momo Ichikawa[1], Tomokazu Hokada[2], Kenichiro Tani[3], Ippei Kitano[4], Sotaro Baba[5], Nugroho I. Setiawan[6], Prayath Nantasin[7], Davaa-ochir Dashbaatar[8], Yoichi Motoyoshi[2]

1. Shimane University, 2. National Institute of Polar Research, 3. National Museum of Nature and Science, 4. Hokkaido University, 5. University of the Ryukyus, 6. Universitas Gadjah Mada, 7. Kasetsart University, 8. Mongolian University of Science and Technology

Keywords: Meta-granitoid, Tenmondai rocks, Lützow-Holm complex, East Antarctica

Mafic veins in the mantle section recovered during Oman Drilling Project: products of backarc spreading?

*Yuji ICHIYAMA[1], Hisatoshi Ito[2], Akihiro Tamura[3], Tomoaki Morishita[3]

1. Chiba University, 2. Central Research Institute of ElectricPower Industry, 3. Kanazawa University

Keywords: Oman ophiolite, Oman Drilling Project, Mafic veins, Backarc spreading

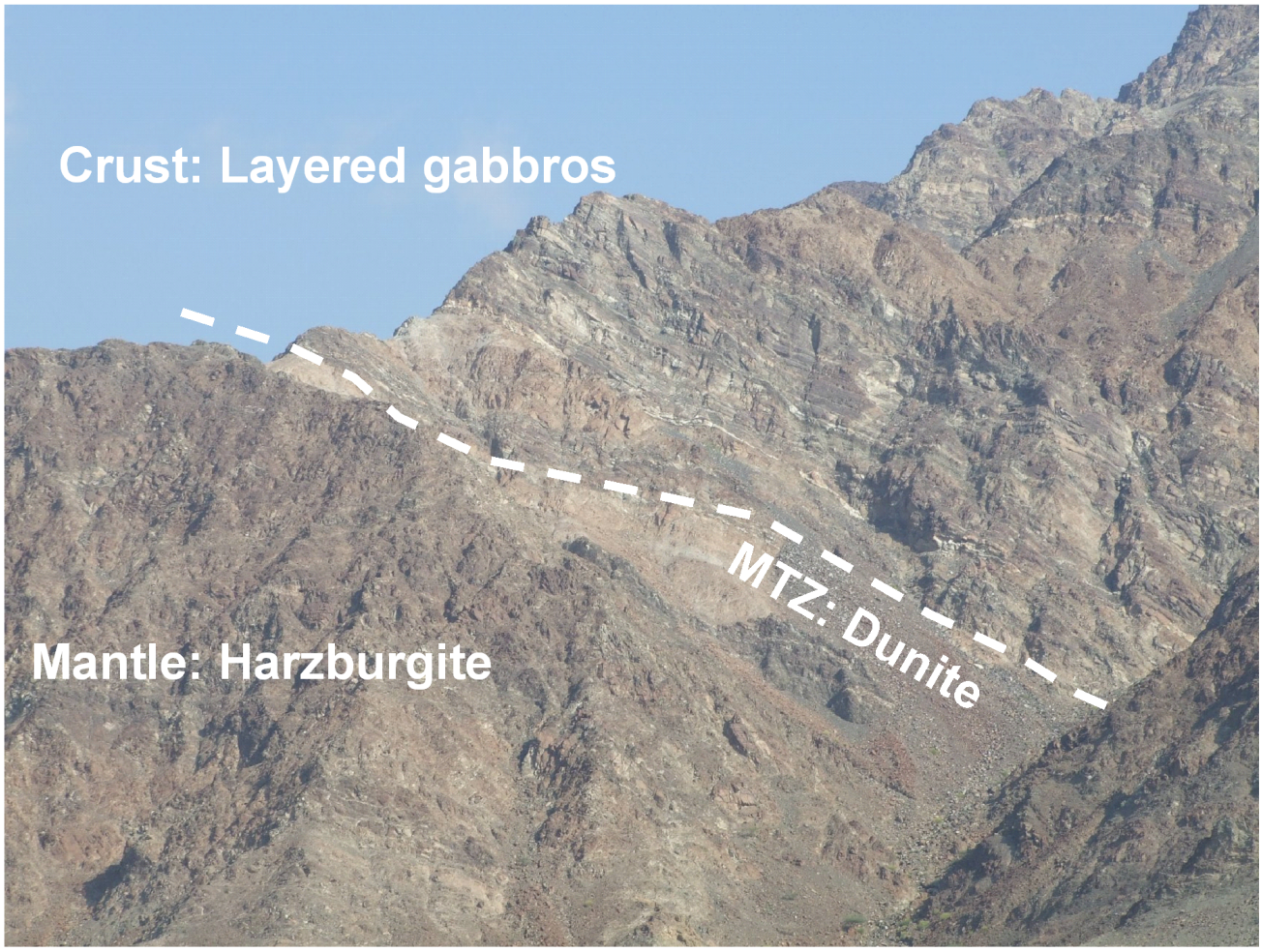
Muographic study of the oceanic crust-mantle density structure of the Oman Ophiolite

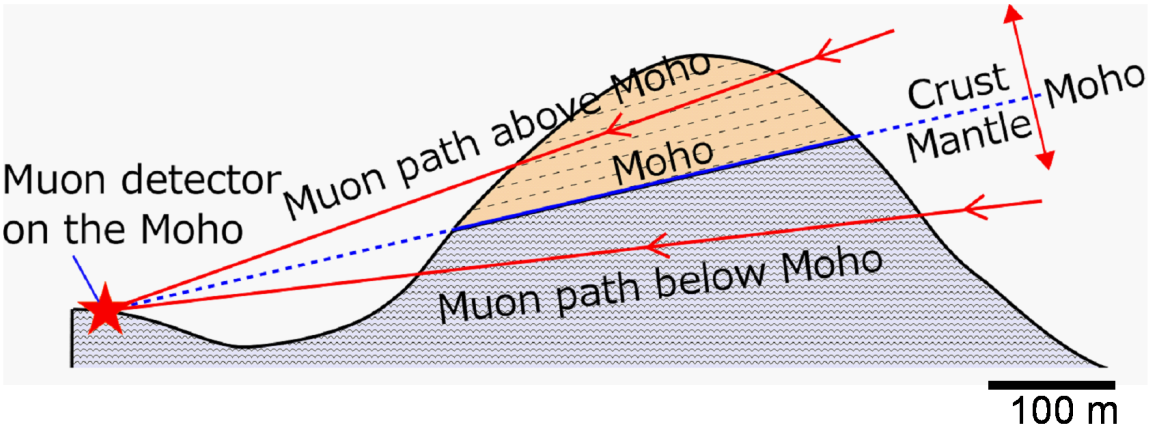
*Susumu UMINO[1], Hiroyuki Tanaka[2], László Oláh[2], Dezső Varga[4], Tomoaki Morishita[1], Yoshihiro Hiramatsu[1], Yuki Kusano[3]

1. Kanazawa University, 2. University of Tokyo, 3. AIST, 4. Wigner Research Center for Physics

The oceanic lithosphere is divided into crust (layers 1-3) and mantle (layer 4) according to seismic wave reflection surfaces and velocity structures. The Layer 1-2 boundary corresponds to the boundary between sediment and basement rock. On the other hand, the Layer 2-3 boundary (upper-lower crustal boundary) and the Layer 3-4 boundary (Moho) are not well understood due to difficulties in observation and lack of basic understanding of geology and lithology. The Layer 2, 3, and 4 have been correlated with the extrusive rocks and sheeted dikes, gabbros, and peridotites, respectively, based on comparison with ophiolite geology. However, in Hole 504B, the only deep-sea drilling that penetrated the Layer 2-3 boundary, the boundary is located in the middle of the sheeted dike complex, which is attributed to alteration and reduced porosity[a]. Hole 1256D penetrated into the gabbros, however, the Layer 2-3 boundary has not been reached yet[b]. The drilling through the Moho and into the mantle is the flagship research project of the next IODP and the most important target of the Project Mohole, but it has not yet been accomplished. Therefore, comparative study of ophiolites is the only clue to understanding the relationships between seismic velocity structure and geology. In particular, the Oman ophiolite, the largest and best preserved in the world, has been intensely studied as an analogue of the fast spread crust and mantle. Kanazawa University, the University of Tokyo, Wigner Research Center for Physics in Hungary, and the Ministry of Energy and Minerals of the Sultanate of Oman are collaborating in an international joint project to image the lithologic boundaries of the Oman Ophiolite, corresponding to the crust-mantle boundary, upper-lower crust boundary, and layer 2A-2B boundary, on the scale of 100 m to km, which can be directly compared with the seismic structure. This presentation will give an overview of the project and the results of preliminary investigations.

Keywords: Muography, Oman Ophiolite, Oceanic crust - Mantle, Moho transition zone, density structure





Muon detectors installed on the Moho acquire muon signals passing through the target.

Magma genesis of the Iwafune diorites, Ibaraki Prefecture

*Haruki YAMAZAKI[1,2], Terumi EJIMA[1,2], Yoshiaki KON[2]

1. Shinshu Univ. Sci., 2. GSJ, AIST

It is important to reveal the magma genesis of plutonic rocks in Southwest Japan during Late Cretaceous to Paleogene to understand crustal growth in Japan because large amounts of plutonic rocks were formed in this age. However, the magma genesis of diorite in eastern Southwest Japan has not been reported. Because of its large surface exposure area, the Iwafune diorite represents diorite in this region. Therefore, we reveal the primitive melt genesis of the Iwafune diorite to understand magma genesis in this region.
The Iwafune pluton consists of diorite, orthopyroxene (opx) diorite, and granite. The opx diorites are lower SiO2 contents and higher enstatite contents of pyroxene than the diorite. The compositional variation of the Iwafune diorite can be explained by the fractional crystallization of clinopyroxene and plagioclase from the opx diorite (Yamazaki et al., 2023). Therefore, the opx diorite composition is the closest to the primitive melt composition of the Iwafune diorite.
In order to consider the genesis of the primitive melt of the Iwafune diorite, the Sr isotopic ratios of the upper mantle were estimated to be SrI of the gabbro in the Tsukuba Mountains (Arakawa and Takahashi, 1989; Shibata and Ishihara, 1979). The Sr isotopic ratios of the lower crust were estimated to be the SrI of the granites in this area (Arakawa and Takahashi, 1989; Shibata and Ishihara, 1979). The SrI of the Iwafune diorite (Shibata and Takagi, 1989) is different from the Sr isotopic ratios of the upper mantle, but it is equal to the Sr isotopic ratios of the lower crust. These results suggest that the primitive melt of the Iwafune diorite was formed by partial melting of the lower crust.
We examined whether partial melting of the lower crust would form the primitive melt composition of the Iwafune diorite. Because the HREE contents of the opx diorites are not depleted, and the temperature of the lower crust is 500-700℃ (Coinde, 2005), we estimate that the lower crust was not saturated with water at about 0.8 GPa when the Iwafune diorite formed. The composition of the melt, which is formed by the partial melting of basalt under these physical conditions (Rapp and Watson, 1995), is nearly equal to the composition of the opx diorite.
Therefore, we conclude that the primitive melt of the Iwafune diorite was most likely formed by partial melting of the lower crust.

Keywords: Diorite, Magma genesis, Iwafune pluton, Tsukuba Mountains

Zircon U-Pb age combined with trace element geochemistry constraining the source of Miocene granitoids of the Kagoshima Prefecture, Japan

*Hafiz Ur REHMAN[1], Marimo NAKABAYASHI[1], Yuki OTA[1], Kaushik DAS[2], Chung Sun LIN[3], Hao YANG LEE[3], Daisuke YAMASHITA[4], Hiroshi YAMAMOTO[1]

1. Kagoshima Uni., 2. Hiroshima Uni., 3. IES, Academia Sinica, Taiwan, 4. Satsumasendai Kosh. Mus.

This study reports zircon U-Pb age and trace element geochemistry of the Miocene granitoids exposed in Kagoshima to constrain their magmatic source. More than 150 zircon grains were U-Pb age-dated along with trace element contents from four plutons (#1. Osumi, #2. Takakuma Yama, #3. Shibi san, and #4. Koshikishima). Zircon grains from Osumi yielded U-Pb age values in the range from 13.4 ~ 15.8 Ma in sample OsG-3, 13.9 ~ 16.8 Ma in OsG-9, 13.3 ~ 14.7 in OsG-12, 14.2 ~ 16.4 in OsG-36. Zircons from Takakuma Yama yielded ages of 12.7 ~ 15.2 Ma from TkG-1 and 12.8 ~ 15.9 Ma in TkG-2. Shibi Pluton yielded ages of 12.7 ~ 14.3 Ma and a hornfels sample (Shb-19) yielded U-Pb age scattered between 13.9 and 206 Ma, with three spots giving values of 1803 Ma, 1873 Ma, and 2194 Ma from the detrital core domains. Zircons separated from Koshikishima Island yielded relatively younger age of 9 ~ 12 Ma in Kos-2, 8.8 ~ 12.1 Ma in Kos-11, 7.8 ~ 10.4 Ma in Kos-19, 8.7 ~ 10.6 Ma in Kos-30, 9.3 ~ 11.4 Ma in Kos-35, and 9.4 ~ 12.3 Ma in Kos-42. Trace element data of zircons, particularly, rare-earth elements, show typical magmatic type patterns with pronounced positive Ce and negative Eu anomalies. Ti-in-zircon thermometry data revealed temperature of crystallization ranging from 609 ~ 895 ℃, with majority of grains showing fall within 650 to 780 ℃ range. Age-data from plutons #1~3 are more or less identical and suggest Miocene magmatism possibly due to the trench-parallel ridge subduction that triggered partial melting in the overlying continental crust. Proterozoic cores suggest incorporation of the recycled crust during the magma formation. Pluton #4, yielding relatively younger age, may have resulted from partial melting of crust enriched in mafic component. Zircon trace element data, along with whole-rock major and trace element contents, also indicate the involvement of mafic component to generate the Koshikishima granitoids in a different tectonic scenario than the others.

Keywords: Zircon, U-Pb age, Miocene, Kagoshima Prefecture, Koshikishima

Chronological re-examination of the Kanmon Group, Southwest Japan: and remaining unsolved problems

*Yukiyasu TSUTSUMI[1], Ryo Hasegawa[2], Yukio Isozaki[3]

1. National Museum of Nature and Science, 2. FUJIFILM Business Innovation Corp., 3. Graduate school of Arts and Sciences, University of Tokyo

Stratigraphic studies were capable in fore arc sediments because they consist mainly of marine sediments which contain index fossils and radiolarian fossils. Whereas intra- and back-arc sediments which consist of terrestrial sediments had no other choice than to correlate fresh-water fauna and/or apply radiometric ages which have low reliability. After decades of developments, zircon U-Pb age method expand application. It is applied not only to clarify eruption/deposition age of tuff beds but also age limitation and provenance studies of clastic rocks.
The Kanmon Group is the one of the intra-arc sediments. Although detrital zircon dating is also applied, it is not statistically significant because of too small number of analyses to interpret. To re-examination of the deposition ages and provenances of the Kanmon Group, we analyzed detrital zircon ages. Age results of this study were shown in the Table and Fig. (A).
New obtained YC1 σ of the Sujigahama and Shihama formations indicate 97 Ma and 101 Ma, respectively. Moreover, considering the age of the Kawara granite (94.8 ±0.9 Ma), the age of the upper most of the Shimonoseki Subgroup is thought to be in Cenomanian. On the other hand, YC1 σ of the Sengoku Formation, the lowermost of the Wakino Subgroup and the Yoshimo Formation, Toyonishi Group indicate similar values of 128 Ma and 130 Ma, respectively. The fact exhibits that the formations are contemporaneous heterotopic facies each other.
Contradictions about ages are also shown. “The age of the tuff bet” in the Kitahikoshima Formation was reported as 106.3 ±1.0 Ma which is older than YC1 σ of the Shiohama Formation which is stratigraphically lower than the Kitahikoshima Formation. The contradiction can be solved to think that the zircon grains were detrital origin and which YC1 σ indicate 99.3 ±1.3 Ma. Another contradiction is that the Lower Wakamiya Formation is too young. Additional research is necessary to solve the contradiction.

Keywords: Kanmon Group, detrital, zircon age, sandstone, tuff

Table. Youngest age indexes for detrital zircons from each sample.

Sample		n of data		YSG	YC1σ			YC2σ		
		All	Conc.	Age (Ma)	Age (Ma)	n	MSWD	Age (Ma)	n	MSWD
Kanmon Group										
SJ*	Sujigahama Fm.	47	33	99.9 ± 1.9	101.0 ± 0.8	3	0.64	103.2 ± 0.4	9	2.16
SJH	Sujigahama Fm.	168	160	94.4 ± 1.7	96.6 ± 0.6	9	0.35	99.2 ± 0.3	42	0.92
SHI*	Shiohama Fm.	39	28	98.1 ± 1.1	98.7 ± 0.6	2	0.44	100.0 ± 0.5	5	2.36
SOH	Shiohama Fm.	155	148	98.4 ± 2.3	101.3 ± 0.9	30	0.43	104.6 ± 0.5	102	1.15
GMO	Kumagai Fm. (Eq. Upper Wakamiya Fm.)	56	47	102.1 ± 2.3	113.9 ± 0.9	2	0.93	113.5 ± 0.7	4	3.12
WA*	Lower Wakamiya Fm.	37	22	105.2 ± 1.0	105.5 ± 0.9	2	0.41	107.2 ± 0.5	4	2.05
SG	Sengoku Fm.	170	157	126.4 ± 3.3	127.6 ± 1.9	2	0.19	177.1 ± 0.9	10	3.30
Toyonishi Group										
YM*	Yoshimo Fm.	33	28	125.2 ± 1.8	221.8 ± 2.0	2	0.21	226.4 ± 1.4	3	6.02
YSM	Yoshimo Fm.	117	98	127.7 ± 1.7	129.7 ± 1.1	3	1.23	130.4 ± 0.9	4	1.51
KS*	Kiyosue Fm.	60	55	124.6 ± 1.1	135.4 ± 0.8	3	0.66	135.4 ± 0.8	3	0.66

Errors are 1σ, *: data from Aoki et al. (2014)

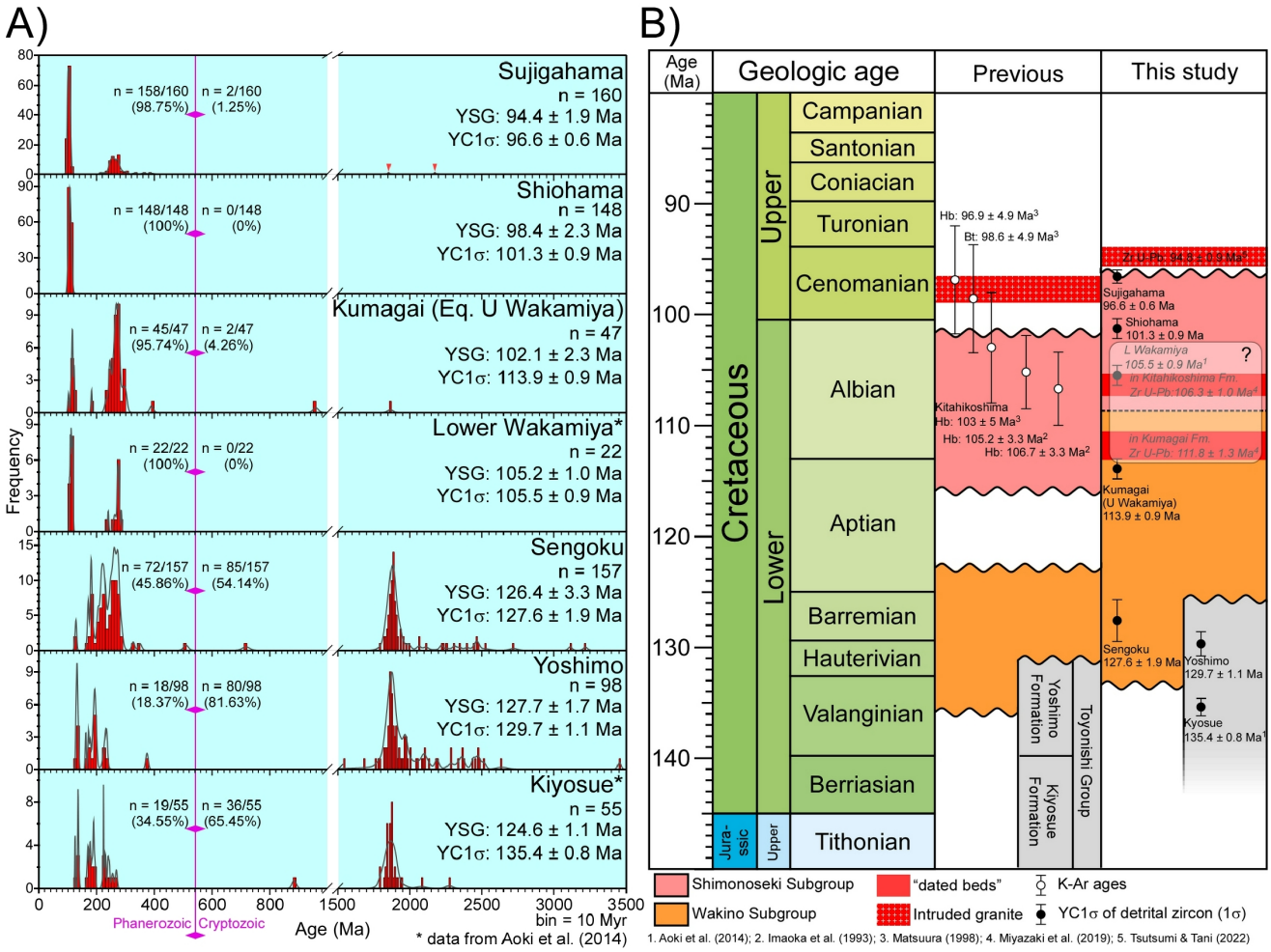


Figure. (A) Probability density diagrams and histograms of concordant age data from each sample. ^{238}U-$^{206}Pb^*$ ages are used for less than or equal to 1000 Ma data and $^{207}Pb^*/^{206}Pb^*$ ages are used for the other data. (B) Stratigraphic charts of Kanmon Group. Previous age estimation is modified after Matusmoto et al. (1982).

U-Pb zircon age of granitoids in the Aoyama area, Ryoke belt, SW Japan

*Fumiko HIGASHINO[1], Tetsuo KAWAKAMI[1], Shuhei SAKATA[2], Shunpei Kudo[1], Yohei IGAMI[1]

1. Kyoto Univ. Sci., 2. Univ. Tokyo

The Ryoke belt shows an elongated distribution over 800 km in Southwest Japan, which is mainly composed of Late Cretaceous high-*T*/low-*P* type metamorphic rocks and plutonic rocks. Whereas the early geochronological studies report eastward younging of Rb-Sr whole rock ages of granitic rocks [e.g., 1, 2], some U-Pb zircon ages and chemical Th-U-total Pb isochron method (CHIME) monazite ages of granitoids are not consistent with the trend [3, 4]. The Aoyama area is one of the well-studied areas in the Ryoke belt, where high-grade pelitic and psammitic metamorphic rocks and granitoids are widely exposed. Since it is apparent that the U-Pb zircon ages of granitoids are not sufficiently available to understand the spatiotemporal evolution of magmatism in the Aoyama area, we performed LA-ICPMS zircon U-Pb dating for six samples out of five granitoids.
Magmatic zircon domains were selected based on microstructural constraint under CL images. Using analyses with concordance between 97-103 %, the weighted-mean U-Pb age is only calculated for one sample. As a result, crystallization timings of granitoids are constrained respectively as ca. 83-75 Ma for Kabuto granodiorite, ca. 76-65 Ma and ca. 77-70 Ma for Ao granite, ca. 92-84 Ma for Joryu tonalite, 75 ±1 Ma for Misugi tonalite, and ca. 110-99 Ma for Kimigano granodiorite.
Zircon in the Misugi tonalite has a multi-phase inclusion composed of cristobalite, kumdykolite, apatite and glass. Mineral assemblage of cristobalite and kymdykolite is reported in nanogranite in garnet from high-*T* metamorphic rock, which is interpreted to be metastable phases [5]. These minerals found in this study are also considered to be metastable, suggesting rapid crystallization from the granitic melt. Further analyses for inclusion in zircon would help understand the range of crystallization timing of granitoids.
[1] Nakajima (1994) Lithos [2] Nakajima et al. (1990) CMP [3] Suzuki & Adachi (1998) JMG [4] Takatsuka et al. (2018) Island Arc [5] Ferrero et al. (2016) CMP

Keywords: granite, zircon, melt inclusion, metastable phase

Oral presentation

R6: Plutonic rocks, volcanic rocks and subduction factory

Chairperson:Takashi Yuguchi, Atsushi Kamei

Sat. Sep 16, 2023 10:15 AM - 12:00 PM 820 (Sugimoto Campus)

[zoom]Zoom

Zoom

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Oral presentation | R5: Extraterrestrial materials

Sat. Sep 16, 2023 2:00 PM - 3:00 PM JST | Sat. Sep 16, 2023 5:00 AM - 6:00 AM UTC | 821 Sugimoto Campus

R5: Extraterrestrial materials

Chairperson:Megumi Matsumoto, Daiki Yamamoto, Yusuke Seto, Shogo Tahibana

2:00 PM - 2:15 PM JST | 5:00 AM - 5:15 AM UTC

[R5-12] Chemical Composition of Circumstellar Amorphous Silicate Dust: Condensation Experiments in the Na-Mg-Al-Si-Ca-Fe-Ni-O System

*Hanako Enomoto[1], Aki Takigawa[1] (1. UTokyo)

2:15 PM - 2:30 PM JST | 5:15 AM - 5:30 AM UTC

[R5-13] Survivability of presolar SiC grains in the protosolar disk: An experimental study

*Daiki YAMAMOTO[1], Aki TAKIGAWA[2], Shogo TACHIBANA[2] (1. Kyushu University, 2. University of Tokyo)

2:30 PM - 2:45 PM JST | 5:30 AM - 5:45 AM UTC

[R5-14] Antarctic micrometeorites containing pseudomorphs of melanophlogite: Dust from the sub-surface ocean of icy satellites or from an unknown type of trans-Neptunian objects?

*Takaaki NOGUCHI[1], Takuya Mitsunari[2,3], Rikako Matsumoto[4,5], Akira Yamaguchi[6], Naoya Imae[6], Toru Matsumoto[1], Toru Araki[7], Hayato Yuzawa[7], Akira Miyake[1] (1. Kyoto Univ. Sci., 2. Ibaraki Univ. Sci., 3. Mitsubishi Elect. Soft. Co., 4. Kyushu Univ. Sci., 5. Ine T.H., 6. NIPR, 7. IMS)

2:45 PM - 3:00 PM JST | 5:45 AM - 6:00 AM UTC

[R5-15] **Studies of Earth's minerals and rocky mixtures beyond Earth**

*Yasunori MIURA[1] (1. Post Yamaguchi Univ. Sci.)

[zoom] Zoom

Chemical Composition of Circumstellar Amorphous Silicate Dust: Condensation Experiments in the Na-Mg-Al-Si-Ca-Fe-Ni-O System

*Hanako Enomoto[1], Aki Takigawa[1]

1. UTokyo

Keywords: circumstellar dust, amorphous silicate, experiment

表 1　出発物質の化学組成

実験	Mg	Si	Fe	Al	Ca	Na	Ni
CI-02	1.03	1.00	0.85	0.08	0.06	0.06	0.05
CI-03	1.03	1.00	-	0.08	0.06	0.06	-
CI-04	1.03	1.00	-	0.75	0.06	0.06	-
$Al_8Si_{100}Mg_{103}$	1.03	1.00	-	0.08	-	-	-
$Al_{31}Si_{100}Mg_{103}$	1.03	1.00	-	0.31	-	-	-
$Al_{64}Si_{100}Mg_{103}$	1.03	1.00	-	0.64	-	-	-
$Al_8Si_{100}Ca_{103}$	-	1.00	-	0.08	1.03	-	-
$Al_8Si_{100}Mg_{51.5}Ca_{51.5}$	0.515	1.00	-	0.08	0.515	-	-

Survivability of presolar SiC grains in the protosolar disk: An experimental study

*Daiki YAMAMOTO[1], Aki TAKIGAWA[2], Shogo TACHIBANA[2]

1. Kyushu University, 2. University of Tokyo

Keywords: Presolar grains, Silicon carbide (SiC), Evaporation/Oxidation, Kinetics, Protosolar disk

Antarctic micrometeorites containing pseudomorphs of melanophlogite: Dust from the sub-surface ocean of icy satellites or from an unknown type of trans-Neptunian objects?

*Takaaki NOGUCHI[1], Takuya Mitsunari[2,3], Rikako Matsumoto[4,5], Akira Yamaguchi[6], Naoya Imae[6], Toru Matsumoto[1], Toru Araki[7], Hayato Yuzawa[7], Akira Miyake[1]

1. Kyoto Univ. Sci., 2. Ibaraki Univ. Sci., 3. Mitsubishi Elect. Soft. Co., 4. Kyushu Univ. Sci., 5. Ine T.H., 6. NIPR, 7. IMS

Keywords: AMM, melanophlogite, sub-surface ocean, solar flare track

Studies of Earth’ s minerals and rocky mixtures beyond Earth

*Yasunori MIURA[1]

1. Post Yamaguchi Univ. Sci.

Minerals of the Earth are formed by active state changes in the three state zones. Without an extraterrestrial ocean system, Earth type mineral is difficult to form. There are local and global phenomena on the Earth, though the formation of the global solid systems requires the ocean system. It cannot be specified in meteorite classification unless it is used a macro- mineral name [1-3].

Keywords: Earth mineral , Rocky mixtures, Meteorite, The Moon, Ocean system

Oral presentation

R5: Extraterrestrial materials

Chairperson:Megumi Matsumoto, Daiki Yamamoto, Yusuke Seto, Shogo Tahibana

Sat. Sep 16, 2023 2:00 PM - 3:00 PM 821 (Sugimoto Campus)

[zoom]Zoom

Zoom

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Oral presentation | R3: High-pressure science and deep Earth's material

Sat. Sep 16, 2023 2:00 PM - 3:00 PM JST | Sat. Sep 16, 2023 5:00 AM - 6:00 AM UTC | 822 Sugimoto Campus

R3: High-pressure science and deep Earth's material

Chairperson:Takaaki Kawazoe(Hiroshima University), Takeshi Sakai(Ehime University), Masayuki Nishi(Osaka University)

2:00 PM - 2:15 PM JST | 5:00 AM - 5:15 AM UTC

[R3-12] High temperature formation of the oxygen-rich Martian core

*Eiji OHTANI[1], William F McDonough[1,2] (1. Tohoku University, 2. University of Maryland)

2:15 PM - 2:30 PM JST | 5:15 AM - 5:30 AM UTC

[R3-13] Microtexture evolution of pure aluminum severely deformed at static high pressures

*Takuo OKUCHI[1,2], Yuto TANAKA[2,1], Naotaka TOMIOKA[3], Tomokazu SANO[4], Tomoki MATSUDA[4], Kazuto ARAKAWA[5], Yusuke SETO[6] (1. Kyoto Univ. KURNS, 2. Kyoto Univ. Mech. Eng., 3. Kochi JAMSTEC, 4. Osaka Univ. Eng., 5. Shimane Univ. NEXTA, 6. Osaka Metropolitan Univ. Sci.)

2:30 PM - 2:45 PM JST | 5:30 AM - 5:45 AM UTC

[R3-14] **Quantitative chemical analysis of the fine textures of natural and synthetic materials using ATEM**

*Kiyoshi FUJINO[1], Naotaka TOMIOKA[2], Hiroaki OHFUJI[3] (1. Non, 2. JAMSTEC, 3. Tohoku Univ.)

2:45 PM - 3:00 PM JST | 5:45 AM - 6:00 AM UTC

[R3-15] Synthesis of polycrystalline diamond from glassy carbon by direct conversion at high pressure and temperature

Chinatsu Ogawa[1], *Tetsuo Irifune[1], Sayako Inoue[1], Takehiro Kunimoto[1], Toru Shinmei[1], Akimasa Suzumura[2], Shoichi Itoh[2] (1. Ehime University, 2. Kyoto University)

[zoom] Zoom

High temperature formation of the oxygen-rich Martian core

*Eiji OHTANI[1], William F McDonough[1,2]

1. Tohoku University, 2. University of Maryland

Discovery of a large Martian core with a large radius and low mean density around 6~6.5 g/cm^3 provided a new constraint for the composition of the Martian core. The early Martian core formation inferred from W-Hf data of SNC meteorites revealed that the fractionation and core formation of Mars occurred within the first 5 million years after the CAI formation, resulting in the super-liquidus temperature during the core formation stage of Mars due to existence of radiogenic element such as ^{26}Al in the early solar system. The metallic iron-silicate partitioning of oxygen and sulfur indicates a high concentration of oxygen at high temperature 400-600 K above the liquidus of the Martian mantle. Thus, the major light elements in the Martian core may be oxygen instead of sulfur, which can account for the observed density and compressional velocity of the Martian core. Liquid immiscibility in the Fe-O-S Martian core during cooling may explain the evolution and extinction of the Martian core dynamo.

Keywords: Martian core, Oxygen, liquid immscibility

Microtexture evolution of pure aluminum severely deformed at static high pressures

*Takuo OKUCHI[1,2], Yuto TANAKA[2,1], Naotaka TOMIOKA[3], Tomokazu SANO[4], Tomoki MATSUDA[4], Kazuto ARAKAWA[5], Yusuke SETO[6]

1. Kyoto Univ. KURNS, 2. Kyoto Univ. Mech. Eng., 3. Kochi JAMSTEC, 4. Osaka Univ. Eng., 5. Shimane Univ. NEXTA, 6. Osaka Metropolitan Univ. Sci.

Keywords: Microtexture of metal, Static high pressure, Stress field, Dislocation, Aluminium

Quantitative chemical analysis of the fine textures of natural and synthetic materials using ATEM

*Kiyoshi FUJINO[1], Naotaka TOMIOKA[2], Hiroaki OHFUJI[3]

1. Non, 2. JAMSTEC, 3. Tohoku Univ.

Keywords: Analytical TEM, Quantitative chemical analysis, Absorption correction

Synthesis of polycrystalline diamond from glassy carbon by direct conversion at high pressure and temperature

Chinatsu Ogawa[1], *Tetsuo Irifune[1], Sayako Inoue[1], Takehiro Kunimoto[1], Toru Shinmei[1], Akimasa Suzumura[2], Shoichi Itoh[2]

1. Ehime University, 2. Kyoto University

Synthesis and characterization of polycrystalline diamond from bulk samples of glassy carbon have been made at pressures 9, 12, and 15 GPa and temperatures from 1800 to 2300℃ using multi-anvil apparatus. The minimum temperature for synthesis of pure polycrystalline diamond was determined as 1700℃ at 15 GPa, which significantly increases with decreasing pressure and reaches 2300℃ at 12 GPa and the minimum temperature is suggested to be even higher than 3000℃ at 9 GPa based on the present and earlier studies. TEM observations on some recovered samples show developments of graphitic layers in the disorganized nano-structures of original glassy carbon, particularly in those samples synthesized at temperatures around 2000℃ at 9 and 12 GPa. The significant increase in the minimum temperature with decreasing pressure may be due to the metastable growth of graphitic layers in glassy carbon, which should kinetically hinder complete conversion to diamond at the lower pressures approaching the graphite-diamond phase boundary.

Keywords: diamond, high-pressure synthesis, nano-polycrystals, glassy carbon, TEM observations

Oral presentation

R3: High-pressure science and deep Earth’ s material

Chairperson:Takaaki Kawazoe(Hiroshima University), Takeshi Sakai(Ehime University), Masayuki Nishi(Osaka University)

Sat. Sep 16, 2023 2:00 PM - 3:00 PM 822 (Sugimoto Campus)

[zoom]Zoom

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