
[EJ] Eveningポスター発表 | セッション記号 P (宇宙惑星科学) | P-PS 惑星科学

[P-PS06] 太陽系物質進化

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原始太陽系星雲における物質形成から原始惑星への集積、天体内部や表面での諸過程を隕石や他の惑星物質に対する研究と実験的研究の両面から議論する。初期太陽系の情報を保存する始原的物質(コンドライト隕石や惑星間塵、サンプルリターン試料)に関しては、それらの鉱物・有機物・水・希ガス・微量元素分析を通して明らかになった知見を総理解することを目指す。分析手法開発研究(化学、理論、物性)や学生の萌芽的研究を歓迎し、将来の太陽系、惑星系形成研究の新たな開拓につなげたい。さらに分化隕石やコンドライト母天体における水質変成・熱変成作用、火成活動、コア・マントル・地殻形成、並びに天体衝突といった現象に加えて、母天体の内部構造や構成物質などについても議論する。実験的手法による惑星物質の組成、相平衡や構造に関する知見なども取り上げ、隕石とあわせて天体における諸過程を議論する。

[PPS06-P07] The shock history of the Asuka LL breccias from the bulk chemical composition and petrology

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Meteorite breccias are significant materials to discuss the evolution of asteroidal bodies, especially shock histories on them. In ordinary chondrites, many breccias have been reported. Here we present our results on LL chondritic breccias, Asuka (A) 12011 and A 12389. The joint expedition party between Japan and Belgium (JARE-54 and BELARE 2012-2013) collected these meteorites from the Nansen Ice Field, Antarctica. The original weights of A 12011 and A 12389 are 113 g and 18.07 kg, respectively. A 12389 is the heaviest meteorite collected by this expedition party. We conducted chemical and petrological study on these breccias.

Both meteorites have been classified as LL breccias. These breccias consist of various kinds of clasts among matrices. The clasts mostly fall into petrologic types 3, 4, 5/6. However, others clasts are present (e.g., melt and darkened clasts). The type 5/6 clasts and the matrices are the most abundant components, 46 and 48 vol.% in A 12011, and 43 and 44 vol.% in A 12389, respectively. The constituent phases are olivine, low- and high-Ca pyroxene, feldspar, phosphates (Cl-apatite and merrillite), chromite, Fe-Ni metal, and troilite. Olivine is mostly homogeneous, with an average composition of Fo₇₂ in both breccias. Low-Ca pyroxene is En₇₆ in A 12011 and En₇₅ in A 12389 on average.

The bulk analysis of these samples are performed by solution ICP-MS method. The measurements were conducted on the Thermo Element XR of NIPR. We analyzed 38 elements, including REE. For major, minor, and trace elements such as Mg, Al, Cu, Zn, Sr, and Ba, A12011 and A 12389 show similar elemental abundances to each other, indicative of ordinary chondritic. This is consistent with the petrological observations that both breccias are similar in texture and mineralogy, and they show LL chondritic features. REE pattern of A12011 and A12389 are also similar to LL chondrite. However, the A 12389 REE pattern is slightly enriched, compared with A 12011 and ordinary chondrites. Although many breccias include exotic clasts such as carbonaceous chondritic, A 12011 and A12389 seem not to include these clasts from our petrological observation. This is also consistent with the bulk compositions. Thus, they are genomict breccias.

Our petrological and chemical data indicate that both Asuka breccias formed through extensive impact processes on LL parent body, and the interior materials consisting of type 5/6 were also excavated and reassembled into these breccias.