Two components mixture of nitrogen isotope composition for CI chondrites deciphered by the stepwise combustion method

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Nitrogen isotope ratio is a powerful tool in cosmochemistry to decipher the origin and evolution of planetary materials. The nitrogen isotope ratio $^{15}N/^{14}N$ exhibits large variations among different meteorites. The isotope ratio of nitrogen, being a typical volatile element, is particularly useful to constrain the formation and evolution processes of planetary atmosphere for Earth and other rocky planets. Viable Earth formation models assume that CI/CM-like volatile-rich carbonaceous chondrites may have contributed as one of the important volatile sources for Earth. CI chondrites, the most volatile-rich chondritic group known so far, exhibit $\delta^{15}N$ values typically around +40 ‰. The higher $\delta^{15}N$ values for the CI chondrites than for the present Earth atmosphere may impose important constraints on the formation and evolution history of the Earth atmosphere. In this presentation, we will present the stepwise combustion profiles obtained for three CI chondrites, fall (Ivuna) and Antarctic (Y-980115 and Y-82162) obtained using the facility equipped at Ibaraki University. We compare our obtained data with literature data for CI-chondrite related samples including the Ryugu return samples.

Keywords: CI chondritic meteorites, nitrogen isotope, stepwise combustion, heterogeneity, Ryugu

