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Silicon isotope measurement in normal and FUN CAIs by LA-MC-ICP-MS

YU-HSUAN CRYSTAL LIANG, YUNG-HSIN LIU, HAO-YANG LEE AND DER-CHUEN LEE

Institute of Earth Sciences, Academia Sinica

Presenting Author: yuhsuanl@earth.sinica.edu.tw

The CAIs provides clues to the environment of earliest stage of the Solar System, and Si isotope might be beneficial on investigating the astrophysical setting during their formation [1]. Silicon isotope in this study were analyzed using a MC-ICP-MS (Nu Plasma II, Nu Instruments) with UV excimer laser ablation system (ANALYTE G2, Photon Machines), and a resolving power of ~8000 was used during the measurement. The accuracy of our measurement was checked with several reference materials, e.g., NIST SRM 612 and 610, basaltic glass BHVO-2G, and zircons (91500 and MudTank), and the results were comparable with the literatures [2,3]. Precision of the *in-situ* LA-MC-ICP-MS Si isotope analyses in this study is 0.16‰ (2s.d.) for δ^{29}Si and 0.28‰ (2s.d.) for δ^{30}Si.

The working standard is San Carlos olivine, which has been suggested as a better standard for laser ablation Si isotopic analysis of CAI [1]. More than 300 normal CAIs were analyzed and the spot sizes varied between 50-130 μm in diameter. The δ^{30}Si for normal CAIs exhibit no mass-independent fractionation and varied by ~14‰. Three FUN CAIs were also analyzed. The *EGG-3* from Allende shows a mass-independent anomaly with an excess in Δ^{29}Si of ~0.3‰, which is consistent with reported value [4]. While one of the two newly identified Allende FUN CAIs exhibits no Δ^{29}Si anomaly, the other one shows an excess in Δ^{29}Si of ~0.5‰. Together with other isotopic and mineralogical information, our results demonstrates that LA-MC-ICP-MS Si isotope analyses in CAIs could be a powerful technique on studying the sources and the earliest evolution of the solar system.

[1] Shahar & Young (2007), *EPSL* 257, 497-510.

[2] Schuessler & Blanckenburg (2014), *Spectrochim. Acta Part B*. 98, 1-18.

[3] Guitresu et al. (2020), *JAAS* 35, 1597-1606.

[4] Clayton et al. (1988), *Philos. Trans. R. Soc. Lond. A* 325, 483-501.