Comprehensive studies on s-process Eu isotopic composition: SIMS analysis of presolar SiCs and Subaru observation of CH stars

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Approximately half of the amount of elements heavier than the iron-group in Solar System originates from the slow neutron-capture process (s-process). The main component of the s-process is known to be produced in asymptotic giant branch (AGB) stars, i.e. evolved intermediate or low mass stars. The chemical abundances, especially, isotopic ratios around branching points of s-process provide unique information on the neutron density and temperature of the s-process site. Among various elements, Eu isotopes are key nuclides in the folloing points; (1) Eu has only two isotopes whose abundances are comparable, (2) ^{153}Eu/^{151}Eu ratio is sensitive to the temperature and neutron density during the s-process because nuclear flow at the unstable nucleus ^{151}Sm depends on those parameters [1], and (3) Eu isotope ratio of carbon-rich stars is determined by astronomical observations [2] and can be directly compared with those of presolar grains cosmochemically determined by ion microprobes.

For the comprehensive studies, we review the Eu composition of presolar grains by SIMS analysis [1, 3] and report our Subaru observation of two CH stars **which** are particular type of carbon stars with enhancement of s-process elements. The Eu isotope ratios of these CH stars (**^{153}Eu/^{151}Eu ~ 1.25**) are consistent with those of presolar grains (**^{153}Eu/^{151}Eu=1.3±0.2 [1]).**

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[2] Aoki W. et al. Astrophysical Journal Letter **592**, L67-70 (2003).
[3] Avila J. N. et al. Astrophysical Journal Letters 768, L18-25(2013)