RB-SR AND CS-BA SYSTEMATICS OF EUCRITES.

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Introduction: Application of radiogenic isotope systematics to eucrites and diogenites put temporal constraints on early differentiation processes in the solar planetary materials. Pioneering works on Rb-Sr systematic of eucrites, angrites, and Ca-Al-rich inclusions (CAIs) from the Allende meteorite showed the isotopic evolution of Sr in the early solar system [1-4]. In this study, Rb-Sr and Cs-Ba systematic were performed on one cumulate eucrite (Y 980433) and eight non-cumulate eucrites (Juvinas, Millbillillie, Stannern, Dar al Gani (DaG) 380, DaG391, DaG 411, DaG 443, DaG 480) for chronological understanding of the early differentiation of the eucrite parent body (EPB)

Experiments: About 200 mg of each powdered sample was decomposed by treatment with HF-$HClO_4$ with heating. Then, the samples were taken to dryness and redissolved in 10 mL of 2M HCl. The solution was divided into two portions: the main portion for isotopic measurements by TIMS and the rest for the determination of elemental abundances by ICP-MS.

Results and Discussion: The Rb-Sr systematic of four non-desert eucrite is consistent with that of previous studies, while that of five DaG eucrites is not. All five DaG eucrites have much higher $^{87}Sr/^{86}Sr$ ratios (0.700153-0.701916) than the expected values from their $^{87}Rb/^{86}Sr$ ratios. Strong enrichments of Ba and Sr in desert eucrites due to recrystallization of carbonates and sulfates as terrestrial weathering products were previously reported [5,6]. As the results of a scanning electron microscope observation of the thin section of DaG eucrites, several deposits of hydrous minerals were found. We examined to remove the weathering products from the meteorite samples by acid-leaching technique using 0.2M HNO_3. The Rb-Sr data from the acid residues are partly improved, but their data points are still upper the 4.55 Ga-old isochron line. Rb-Sr data are sensitive to recognize the presence of terrestrial weathering products in extraterrestrial materials.

In general, Ba isotopic compositions in primitive materials such as CI and CM chondrites are heterogeneously anomalous by the additional nucleosynthetic components [7,8], while those in eucrites are quite normal probably by homogenization due to early metamorphism on the EPB. We expected isotopic evidence for the existence of radiogenic ^{135}Ba decayed from ^{135}Cs after the early metamorphism of the EPB. However, in this study, Ba isotopic deviation patterns of all eucrites show much flatter than those in primitive chondrites, and no evidence for radiogenic ^{135}Ba and additional nucleosynthetic components.

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