SILICATE MELT MIGRATION IN THE ACAPULCOITE-LODRANITE SOURCE INFERRED FROM ALKALI AND REE ABUNDANCES. N. Morikawa[1] and N. Nakamura[1,2], [1]Graduate School of Science and Technology and [2]Department of Earth and Planetary Sciences, Faculty of Science, Kobe University, Nada, Kobe 657, Japan.

Petrogenesis of acapulcoites have been debated as to if they formed by extensive partial melting (1) or by very small degree (<1%) melting (2). In order to evaluate melting and melt migration processes, we have continuously made effort to clarify detailed abundance features of lithophile elements (particularly alkalis and REEs) of acapulcoite-lodranite meteorites. Among trace lithophiles, alkalis and REEs are most sensitive to partial melting and melt removal during magmatic processes. In this work, we have developed a direct-loading isotope dilution technique of Li analysis for a tiny meteoritic material (3), and then carried out precise and systematic analyses of 25 major, minor trace elements including alkalis (Li, Na, K, Rb) and REEs for additional 6 meteorites by isotope dilution, atomic absorption and ICP and tried to evaluate the limit of melting and melt removal in the silicate/metal/ sulfide source. Including previous works (4,5), we have studied Acapulco, ALH81187, 81261, EET84302, LEW88280, MAC88177, ALH78230, Y74063, Y8002 and Y74357.

As reported previously (4,5) and in this work, we are now quite confident that 1) all the acapulcoite-lodranite meteorites so far analyzed by us indicate systematic alkali depletion with the increasing depletion of larger ions (Li<Na<K<Rb), and 2) acapulcoites show minor but definite LREE depletion with a depletion factor of 0.9 ~ 0.7 relative to the CI (La/Lu), and 3) lodranites indicate extensive LREE depletion with a negative Eu anomaly.

It is pointed out that minor REE fractionations exist for bulk ordinary chondrites (up to 20%) but variations of the La/Lu ratios are not so systematic like those observed for acapulcoites (6,7). Except for Acapulco, most acapulcoite-lodranite meteorites have La/Lu ratios in correlation with the LREE-abundances, along with systematic alkali depletion. Therefore, in order to reconcile alkali depletion and LREE fractionations, it is required to invoke the removal of at least some fractions of silicate melts. We suggest that acapulcoites and lordranites had a common chondritic source and that succesive melting and melt removal of not only metal/sulfides but also silicate fractions had occurred in the source region.Using solid/melt partition coefficients, we have carried out a partial melting model calculation. It is suggested that melting degrees of silicates were 1 ~ 5% for acapulcoites (mostly plagioclase) and 12 ~ 14% for lodranites (plagioclase and clino-pyroxene). As discussed from petrologic and chemical observations (2, 8,9), the genesis of lodranites as partial melting residues has been well established but that of acapulcoites is much more debated regarding their melting processes.

From the above mentioned alkali and LREE depletion, we strongly suggest that the acapulcoite source suffered certain degrees of partial melting of silicate (mostly plagioclase) and significant amounts (1~5%) of partial melts were removed from their source region.

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