EARLY CORE FORMATION OF THE ASTEROID VESTA REVEALED BY HSE CONCENTRATIONS IN EUCRITES.

N. Slotte[1,2], V. Debaille[1], A.N. Wainwright[1], S. Goderis[2], A. Luguet[3]
[1]Laboratoire G-Time, Université Libre de Bruxelles, Brussels, Belgium (nslotte@ulb.ac.be); [2]AMGC, Vrije Universiteit Brussel, Brussels, Belgium ; [3]Universität Bonn, Bonn, Germany.

Highly siderophile elements (HSE: Os, Ir, Ru, Rh, Pt, Pd, Re, Au) are characterized by a strong affinity for iron with respect to silicate materials [1,2].
These elements have been partitioned into the metallic core of planetary bodies during early differentiation, leaving their silicate portions stripped of HSE [3]. Thus, the HSE concentrations in the silicate mantle and crust mainly depends on the HSE metal-silicate partition coefficients but also the replenishment during and after core formation by the accretion of chondritic materials [3].
We analyzed five unbrecciated eucrites previously dated by Al-Mg systematics [4] for their HSE systematics. These eucrites can be divided in two distinct populations based on their chondrite-relative HSE abundances. We suggest that the discrepancies in HSE depletion reflect the progressive decrease of core segregation intensity in favor of the intake of HSE by chondritic accretion in the vestan mantle within 1 million years. The HSE concentrations in the silicate crust of Vesta thus capture the competition of both HSE depletion and enrichment by core formation and chondritic intake, respectively. Our results highlight that core segregation was an efficient and progressive process that can be tracked down by using HSE.

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