GEOCHEMISTRY OF HED CUMULATES: A SYNTHESIS. J. A. Barrat[1,2], A. Yamaguchi[3], R. C. Greenwood[4], C. Bollinger[1,2], M. Bohn[1,2], J. Cotten[1,2], and I.A. Franchi[4]. [1]Université Européenne de Bretagne. [2]UBO-IUEM, CNRS UMR 6538, place Nicolas Copernic, 29280 Plouzané Cedex, France. E-mail: barrat@univ-brest.fr. [3]NIPR, Tachikawa, Tokyo 190-8518. [4]PSSRI, The Open University, Milton Keynes MK7 6AA.

The magmatic activity on Vesta was certainly dominated by a large-scale melting event, which generated a global magma-ocean. According to this view, eucrites can be explained in terms of fractional crystallization, with subsequent contamination of the melts by liquids derived by partial fusion of the asteroid's crust [e.g, 1-3]. The HED cumulates (cumulate eucrites, diogenites, and a dunite) point to a more intricate history. There is general agreement that cumulate eucrites formed from eucritic melts [e.g, 4-5]. The situation is less clear for the other cumulates. In this study, we will present new major and trace element analyses of cumulates from Vesta, including the olivine-rich lithologies, and the most ferroan diogenites. Our new data extend the range of diogenetic trace element abundances [e.g, 6-8]. The diversity of the REE patterns displayed by diogenites and olivine diogenites is inconsistent with a simple magma ocean model, despite the homogeneity of the $\Delta^{17}O$ values shown by eucrites and the various cumulate lithologies [e.g, 9-11]. There is no direct genetic link between diogenites and eucrites, with trace element features pointing to the involvement of a variety of parental melts, whose compositions are difficult to precisely assess. Some of them display a strong HREE enrichment, and could be produced by the melting of the magma-ocean cumulates. Among all the HED collections, cumulates or breccias containing debris of cumulates are far from rare (about 40 % of the population). It is therefore surprising that no potential parental melt for the diogenites has yet been identified. The lack of rocks with a suitable composition to be diogenitic parental melts indicates that our present HED collection does not contain material from all the terrains exposed on Vesta, as was recently suggested by a study of impact glasses found in howardites [12]. The remote sensing studies that will be performed during the Dawn mission should provide a better picture of the petrologic diversity of Vesta's surface, and help to draw a coherent setting for the various types of cumulates.

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