STILL MORE DIVERSITY IN THE DIOGENITE PARENTAL MELTS.

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We report on the major and trace element abundances of 18 diogenites (Bilanga, Johnstown, Tatahouine, Dhofar 700, NWA 4272, Asuka 881526, Asuka 881548, Asuka 881839, EETA 79002, GRO 95555, LAP 02216, LAP 03569, LAP 03630, MET 00422, MET 00424, MET 00425, MET 00436, MIL 03368), and O isotopic compositions for three of them.These new analyses extend significantly the diogenite compositional range, both in respect of Mg-rich (e.g., MET 00425, MgO= 31.5 wt%) and Mg-poor varieties (e.g., Dhofar 700, MgO= 23 wt%). No strong correlations are obtained between major and trace elements, with the noticeable exception of Sc abundances, which are positively correlated with the FeO/MgO ratios. The wide ranges of siderophile and chalcophile element abundances are well explained by the presence of inhomogeneously distributed sulfide or metal grains within the analyzed chips. The behavior of incompatible elements in diogenites is more complex, as exemplified by the diversity of their REE patterns. In most cases, diogenites are light REE depleted, with a large negative Eu anomaly, but three diogenites (A-881839, MET 00425 and MET 00436) display a flat REE pattern. A leaching experiment has been undertaken on one of them, and this demonstrates that the involvement of a very limited amount of phosphate can account for their atypical REE patterns. Seven of the 13 Antarctic diogenites analyzed here (Asuka 881526 - EETA 79002 group) display very similar REE patterns, and we propose that these particular samples originated from the same magmatic system, or alternatively that they formed from very similar parental melts. Another Antarctic diogenite (MET 00424) displays very low incompatible element abundances, and an extremely low $(Dy/Yb)_n$ ratio close to 0.05. The range of incompatible element abundances, and particularly the range of Dy/Yb ratios in diogenites is best explained by the diversity of their parental melts, and we confirm that some diogenites (e.g., Tatahouine and MET 00424) formed from magmas displaying significant heavy REE enrichments. The compositions of the parental melts of diogenites are difficult to constrain. We estimate that their FeO/MgO ratios range from about 1.4 to 3.5 and therefore largely overlap the values obtained for non-cumulate eucrites. Thus, the diversity of the parental melts required to explain the incompatible element features of the diogenites, and the fact that these melts were not systematically more "primitive" than the eucrites, strongly indicate that diogenites and eucrites are not cogenetic.