

The metal/silicate partition coefficients of highly siderophile elements during core formation

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We investigate the metal/silicate partition coefficient of highly siderophile elements at the conditions of the base of a primitive magma ocean during core segregation. The goal of this work is to determine if chemical equilibration at high pressures and temperatures can account for the abundances of highly siderophile elements in the Earth's mantle or if another mechanism such as the late veneer is responsible for these observations. Our approach to this problem attempts to overcome some of the difficulties faced by similar studies.

Current sample preparation efforts include doping powdered basalt with highly siderophile elements (Pt, Au, and Pd) and glass synthesis using a gas levitation laser-heating system. The doped glasses will be mixed with metallic iron and held at high temperatures and pressures in a laser heated Diamond Anvil Cell (DAC). After quench, the samples will be milled with the Focused Ion Beam (FIB) and prepared for NanoSIMS (Nanoscale Secondary Ion Mass Spectroscopy). The use of suitable calibration standards at the NanoSIMS permits the measurement of absolute trace element compositions, from which the partition coefficients will be determined.

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