Metal-silicate partitioning of carbon at the core formation

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Carbon has been considered to be one of the possible major light elements in the Earth’s core. While carbon is known to be strongly siderophile (iron-loving) at relatively low pressures, its metal-silicate partitioning under high pressure and temperature (*P*-*T*) conditions, typical for those of core segregation from silicate (~50 GPa, 3500 K), has been least examined yet. Here we performed melting experiments on Fe metal + MORB glass at such high *P*-*T* conditions in a laser-heated diamond-anvil cell (DAC). The metal-silicate partitioning of carbon was examined by using two different sets of starting materials; carbon was included in Fe in one set of experiments, and it was contained as CO_2 in silicate glass in another set. After melting at high *P*, samples were recovered from a DAC, and their cross sections were prepared with a focused ion beam (FIB). Textural and compositional characterizations were made by electron microprobes. Subsequently carbon concentrations in coexisting molten iron and silicate melt were obtained by using a high-resolution imaging technique with secondary ion mass spectrometry (SIMS). These experimental results and the possible concentration of carbon in the core will be discussed at the meeting.

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