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Partitioning of carbon between metallic- and silicate-liquids in carbonaceous chondrite compositions at high pressure

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Major volatile elements in the terrestrial planets are oxygen, sulfur, carbon, hydrogen, and nitrogen. They are also candidates for light components in the earth's core which were incorporated into the core at terrestrial magmaocean stage. Partitioning behavior of carbon has not been determined well though it is one of the strong candidates for light elements in the earth's core. We investigated partitioning of carbon with sulfur and oxygen between metallic- and silicate liquids at 6 GPa and 2073 K in carbonaceous chondrite composition (Allende meteorite; CV3). Effect of nitrogen and water as accessory components were also examined. High pressure experiments were conducted with multi-anvil high pressure apparatus. Graphite was used as capsule material. Composition of coexisting metallic- and silicate liquids were measured by electron microprobe with wavelength dispersion type spectrometer except for carbon in silicate liquid. Carbon concentration of bulk recovered sample was measured by elemental analyzer. Then, carbon concentration in silicate liquid was obtained by subtraction of carbon amounts in metallic phase which obtained by electron microprobe and SEM image analyses. Present result suggests that in oxidized carbonaceous chondrite composition, partitioning coefficient of carbon [$D^{Metallicliquid/Silicateliquid} = C^{Metallicliquid}/C^{Silicateliquid}$; C is concentration of carbon in wt.%] is close to 1, and it may increase with increasing the Fe^{metal}/Fe^{oxide} ratio in the carbonaceous chondrite composition.