I075-003 Room: IC Time: May 27 14:00-14:15

High Pressure and High Temperature Phase Transition of Fe and FeO up to 145 GPa

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The phase transitions in Fe and FeO were investigated at high pressure and high temperature up to 145 GPa and 2500 K with in situ X-ray diffraction measurements. The fcc iron (g-phase) transforms to hcp e-phase at 38 GPa and 1600 K, and e-iron is stable at least up to 145 GPa at 1300-2500 K. Neither d-hcp nor orthorhombic structures, previously proposed as b-phase, were observed in this pressure and temperature range. The B1 (NaCl) structure of FeO is observed up to 130 GPa at high temperature conditions (1400-2500-K), and transforms to a rhombohedral structure at 140 GPa and 1900 K. The B8 phase with a (inverse-like) NiAs structure was also observed at 70-100 GPa at high temperature under more reduced conditions. On the basis of our observations under different experimental conditions, the phase change between B1 to B8 structure may depend on a rate of the iron defect (x) in Fe1-xO. The high-temperature compression curve of FeO with B1 structure obtained at 1750 K shows no discontinuity up to 125 GPa. Theses results give constraints of the physical property of Earth's core, the mineralogy of lower mantle and the mechanism of the incorporation of oxygen into the core.