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Density and structure of molten iron under pressure

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Physical properties of molten iron, such as density, are fundamental to understand the dynamics of the core of the terrestrial planets. Structures of molten iron alloys at high pressures are interested, because the physical properties of melts are strongly related to those structures. Therefore, we have investigated the density and the structure of molten iron alloys at high-pressures by using synchrotron radiation. Here we report the results of density measurements and the X-ray diffraction analysis of molten iron under pressure. The density is determined up to 3 GPa by X-ray absorption technique at BL22XU, SPring-8, and the structure is investigated up to 7 GPa by using energy dispersive X-ray diffraction analysis at PF-AR NE5C, Photon Factory. Combined density data with diffraction data, we derived the coordination number of Fe melt at high pressures. We will discuss how the structure of molten iron responds to pressure.