

Melting criterion in laser heated diamond anvil cell experiments: Combined in situ and ex situ methods

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The major portion of the Earth's core is in the liquid state, accounting for 18% of the total planetary volume. Although mostly composed of iron, it contains impurities that lower its density and melting point with respect to pure Fe. It is therefore important to determine melting relations and melting temperature of iron alloys under extreme conditions to constrain thermal structure and dynamic of the Earth's core.

We will present results of XRD and XANES measurements on liquid iron alloys in Laser-Heated Diamond Anvil Cell (LH-DAC) up to megabar conditions, obtained respectively on ESRF beamlines ID27 and ID24. We will also present complementary laboratory experiments performed on iron alloys, combining in situ temperature versus power measurements and microscopic study of recovered samples.