

Density measurement of Fe-S liquid at high pressure

Keisuke Nishida[1]; Hidenori Terasaki[2]; Eiji Ohtani[3]; Akio Suzuki[4]

[1] Mineral.Petrol.& Econ.Geol.,Tohoku Univ; [2] Inst. Mineral. Petrol. and Econ. Geol., Tohoku Univ.; [3] Institute of Mineralogy, Petrology, and Economic Geology, Tohoku University; [4] Faculty of Science, Tohoku Univ.

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Density of liquid Fe-alloys is a fundamental property to estimate the composition and dynamics of the core of the Earth and other planets. The density of liquid Fe-S was measured at 4 GPa and 1923 K using a newly developed sink/float method. In this method, used composite density marker consists of Pt rod core and Al₂O₃ tube surroundings. Since the uncertainties of density of composite marker is much smaller than the composite sphere which has been previously used, the density of liquid Fe-S can be precisely determined. The measured density of liquid Fe-S decreases with increasing sulphur content in Fe-alloy at 4 GPa and 1923 K. This tendency is consistent with the results measured at ambient pressure. The effect of sulphur content on the density become to be larger in the sulphur-rich composition (S higher than 40 at.%). Therefore, this result is applicable to discuss the density and the amount of light elements in the core. Furthermore, this new method is also applicable to density measurement of other Fe-alloy at high pressure.