## Sound velocity of liquid Fe-Ni-S-Si at Mercury outer core condition

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A large Mercury core consists mainly of Fe and Ni and also contains some light elements. The X-ray spectroscopy measurements by the MESSENGER spacecraft indicates that 1-4 wt% S is included on its surface. Based on the partitioning behavior of S and Si between metal and silicate melts, both S and Si can be contained in metal phase when coexisting silicate melt contains 1-4 wt%S, suggesting that both S and Si are likely to be included in the outer core (Chabot et al. 2014). Thus, elastic properties of liquid Fe-Ni-S-Si are important implication to study the interior structures of Mercury and properties of liquid outer core.

In this study, we performed sound velocity measurement of liquid Fe-Ni-S-Si up to 14.8 GPa and 1943 K using multianvil press at BL04B1, SPring-8 facility. The sound velocity was measured using the pulse-echo overlap method. The P-wave velocity increases with pressure. Although the P-wave velocity of liquid Fe-Ni decreases by addition both of S and Si, it likely to increase from the velocity by addition of only S.

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