

## The sound velocity of liquid Fe-Ni-S-Si alloys under Mercury's core condition

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Mercury has a large liquid core and it mainly consists of Fe-Ni and possibly contains some light elements. The X-ray spectroscopy measurements by the MESSENGER spacecraft indicates that surface on Mercury contains 1-4wt% S (Nittler et al. 2011). When silicate containing 1-4 wt%S coexists with liquid metal, S and Si tend to dissolve into liquid metal based on partitioning of S and Si between metal and silicate melts. This suggests that both S and Si are likely to be included in the outer core of Mercury (Chabot et al. 2014). Thus, elastic properties of liquid Fe-Ni-S-Si at BL04B1 and BL22XU beamlines, SPring-8 Facility. High pressure was generated using 1500ton Kawai-type or 180 ton cubic multianvil press. The sound velocity was measured using the pulse-echo overlap method. We used two kinds of compositions (Fe-11wt%Ni-6wt%S-4wt%Si and Fe-11wt%Ni-3wt%S-8wt%Si) for Fe-Ni-S-Si sample. The P-wave velocity ( $V_p$ ) was measured up to 16 GPa and 2000 K and it increases with pressure. Temperature dependence on the  $V_p$  of liquid Fe-Ni (Kuwabara et al. 2016), the  $V_p$  of liquid Fe-Ni decreases approximately 1.6 % by addition of 6 wt%S and 4 wt%Si and increases approximately 3.1 % by addition of 3wt%S and 8wt%Si. This suggests that the effect of S reduces the  $V_p$  effectively also in the Fe-Ni-S-Si system.

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