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LETTER

New high-pressure B2 phase of FeS above 180 GPa

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ABSTRACT

FeS exhibits extensive polymorphism at high pressure and temperature. All with NiAs-type (B8) or closely related structures. Here we report a new phase transition from FeS VI to CsCl-type (B2) phase (FeS VII) above 180 GPa based on the synchrotron X-ray diffraction (XRD) measurements. A significant volume reduction by 3.0% was observed at the phase transition, due to an increase in the coordination number from six to eight. Present results suggest that a substantial amount of sulfur may be incorporated into an Fe-Ni alloy with *bcc* structure in the Earth's inner core.

Keywords: Earth's core, troilite, high pressure, phase transformation, iron sulfide