

Abstract Submitted
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High pressure study of mixed valence compound CsAuI₃ SHIBING WANG, SHIGETO HIRAI, ALEXANDER KEMPER, Stanford University, MARIA BALDINI, Geophysical Laboratory, HONGWEI MA, Indiana University, SCOTT RIGGS, MAXWELL SHAPIRO, TOM DEVEREAUX, IAN FISHER, WENDY MAO, TED GEBALLE, Stanford University — CsAuI₃, chemically described as Cs₂Au^IAu^{III}I₆, is a mixed valence compound in the family of CsAuX₃ (X = Cl, Br, I), resembling the high T_c superconductor parent compound BaBiO₃. At ambient conditions it adopts a distorted perovskite structure with compressed Au^IX₆ octahedra and elongated Au^{III}X₆ octahedra along the crystallographic c-axis. The compound undergoes a pressure-induced transition into a new tetragonal phase comprising nearly equivalent AuX₆ octahedra around 5.3 GPa, which agrees with the valence transition previously reported using Mössbauer spectroscopy between 8-12 GPa. We present a thorough high pressure studies of CsAuI₃ through X-ray diffraction and Raman spectroscopy, confirming a pressure-induced band Jahn-Teller effect associated with the 5d⁹ Au^{II} ion. We will also report the reversible amorphization above 15 GPa.

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