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Pressure-induced phase transformation of In_2Se_3 ANYA RASMUSSEN, SAMUEL TEKLEMICHAEL, ELHAM MAFI, YI GU, MATTHEW MCCLUSKEY, Washington State University — Phase-change memory, with fast read-write speeds and small dimensions, will soon replace flash memory in our cell phones and tablets. This type of memory relies on phase change materials like indium selenide, In_2Se_3 , a III-VI semiconductor that exists in multiple crystalline phases. To achieve controlled switching between phases, it is important to understand both the thermal and elastic properties of In_2Se_3 . Using synchrotron x-ray diffraction and a diamond-anvil cell, a pressure-induced phase transition in powder In_2Se_3 from the α phase to β phase was discovered at 0.7 GPa. This pressure is an order of magnitude lower than phase-transition pressures in most semiconductors. Raman spectroscopy experiments confirm this result. The bulk moduli are reported for both α and β phases, and the c/a ratio for the β phase is shown to have a nonlinear dependence on pressure.

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