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Successive pressure-induced structural transitions in relaxor $\mathbf{Pb(In_{1/2}Nb_{1/2})O_3}$[1] MUHETAER AIHAITI, Carnegie Institution of Washington, Washington DC 20015, USA, SEIJI KOJIMA, University of Tsukuba, Ibaraki 305-8573, Japan, NAOHIKO YASUDA, Gifu University, Gifu 501-1193, Japan, RUSSELL HEMLEY, Carnegie Institution of Washington, Washington DC 20015, USA — We employed Raman scattering and x-ray diffraction to investigate the behavior of disordered $Pb(In_{1/2}Nb_{1/2})O_3$ (PIN) under pressure up to 50 GPa at 300 K. The sharp peak centered at 370 cm^{-1} increases its intensity with pressure. Two Raman peaks around 550 cm^{-1} merge at 16 GPa and their linewidths increase with pressure. The structural phase transition is associated with a splitting of the 50 cm^{-1} peak above 16 GPa. In most Pb-based relaxors, in contrast to PIN, the 50 cm^{-1} peak shows a slight hardening with pressure and no splitting is observed. The pressure evolution of the diffraction patterns for PIN shows obvious splittings above 16 GPa, particularly for the pseudo-cubic [110], [111] and [220] diffraction peaks, indicative of a symmetry-lowering transition. Our results demonstrate that PIN undergoes successive structural phase transitions. The transition at 6 GPa is similar to that observed in other Pb-based relaxors and related to the octahedra tilting; the transition at 16 GPa could be a rhombohedral to orthorhombic transition, and the transition at 38 GPa is assigned to an orthorhombic to a monoclinic transition.

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