

Abstract Submitted
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High-pressure studies of cycloheptane up to 30 GPa¹ CHUNLI MA, QILIANG CUI, Jilin University, ZHENXIAN LIU, Carnegie Institution of Washington — High-pressure synchrotron angle dispersive x-ray diffraction, Raman scattering and infrared absorption studies have been performed on cycloheptane (C₇H₁₄) up to 30 GPa at room temperature by using diamond anvil cell techniques. The synchrotron x-ray diffraction results indicate that the liquid cycloheptane undergoes two phase transitions at around 0.5 and 1.0 GPa, respectively. Then, it gradually turns into glass state starting from 3.0 GPa. The features of the Raman scattering and infrared absorption show no significant changes with increasing pressure below 3 GPa. This implies that the two phases observed by the x-ray diffraction can be attributed to plastic phases in which the cycloheptane molecules are held in an ordered structure while the molecular orientation is disordered. Up on further compression, all Raman and infrared bands begin broadening around 3.0 GPa that provide further evidence on the transition to glass state. Our results also suggest different paths on phase transitions under isothermal compression at room temperature compare to that previously reported under isobaric cooling at ambient pressure.

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