

Abstract Submitted  
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**Spectroscopic Studies of Cyclopentane under Extreme Conditions and Implications for the P-T Phase Diagram**<sup>1</sup> CHUNLI MA, ZHENXIAN LIU, Geophysical Laboratory, Carnegie Institution of Washington, 5251 Broad Branch Road NW, Washington D.C. 20015, USA, QILIANG CUI, State Key Laboratory of Superhard Materials, Jilin University, Changchun 130012, China, RUSSELL HEMLEY, Geophysical Laboratory, Carnegie Institution of Washington, 5251 Broad Branch Road NW, Washington D.C. 20015, USA — Infrared (IR) spectroscopy and Raman scattering combined with diamond anvil cell (DAC) and cryogenic techniques have been employed to investigate cyclopentane up to 4 GPa in the temperature range of 100-350 K and isothermal compression up to 84 GPa at room temperature. Four phases including liquid, plastic phases I and II, and truly crystalline phase III are clearly identified in the P-T range studied based on the changes of the ring breathing mode and CH<sub>2</sub> rocking modes. The phase diagram is extended to the pressure and temperature range of 0 – 4.0 GPa and 105 – 350 K. Further compression at room temperature up to 84 GPa, another high-pressure phase (IV) is observed based on the appearance of low frequency peaks related to the lattice vibrational modes in the synchrotron far-IR spectra. The spectroscopic results indicate that cyclopentane persists the orientation ordered crystalline phase up to 84 GPa at room temperature.

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