

Abstract Submitted
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Simple Molecular Systems at High Pressures and Temperatures.¹

ALEXANDER GONCHAROV, Geophysical Laboratory, Carnegie Institution of Washington, JONATHAN CROWHURST, LLNL — Knowledge of the elastic, optical and vibrational properties of materials under extreme conditions of high pressure and temperature is crucial for interpreting the results of seismological and planetary observations, for materials science, and for improving our understanding of fundamental physics and chemistry under such conditions. We will present the results of Raman, infrared, and x-ray diffraction measurements of hydrogen, water, nitrogen, and oxygen under conditions of high static pressure and temperature in the diamond anvil cell. High temperatures were generated mainly by laser heating, but also using internal resistive heating. These studies revealed novel phase transitions, complex phase diagrams, unexpected chemical transformations and also helped to establish the behavior of interatomic interactions in molecular materials. We thank the following individuals for contributing to this work: N. Goldman, L. Fried, C. Mundy, J. Zaug, R. J. Hemley, E. Gregoryanz, C. Sanloup, M. Somayazulu, Y. Meng, N. Guignot, M. Mezour.

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