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**High pressure-temperature Raman spectroscopy of H<sub>2</sub>-H<sub>2</sub>O clathrate.** MADDURY SOMAYAZULU, Geophysical Laboratory, Carnegie Institution of Washington, ALEXANDER LEVEDAHL, St. Anslem's Abbey School, ALEXANDER GONCHAROV, HO-KWANG MAO, RUSSELL HEMLEY, Geophysical Laboratory, Carnegie Institution of Washington — The melting curve of the C2 clathrate H<sub>2</sub>-H<sub>2</sub>O has been determined by *in-situ* Raman spectroscopy measurements in an externally heated diamond anvil cell. We have determined the melting curve to a maximum pressure of 27 GPa. These are the first measurements on the melting line in this clathrate. Depending on the stoichiometry of the starting mixture of H<sub>2</sub> and H<sub>2</sub>O, we are able to study either a mixture of C2 and H<sub>2</sub>O or C2 and H<sub>2</sub>. In either case, we were able to pinpoint the melting of the clathrate from the measurements of the molecular stretching mode (vibron) in the clathrate. In the case of C2 + Ice VII, we observe the vibron in the clathrate at a frequency higher than in pure H<sub>2</sub> at the same pressure. We have cross-calibrated the melting temperatures using the Stokes-anti Stokes ratio of the diamond first order and Raman active TO phonon of cubic Boron Nitride. We find that the clathrate melts well above the H<sub>2</sub> melting at all pressures studied indicating that the stabilization of this clathrate at high pressures is indeed due to interactions between the host and guest molecules.

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