Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Symmetrization of Dense D_2S under Pressure[1] SAKUN DUWAL, CHOONG-SHIK YOO, Washington State University — Solid H_2S, like H_2O, is a typical hydrogen-bonded molecular crystal; yet, unlike H_2O, the stability and chemistry of dense H_2S is substantially more complex and less understood. We have investigated the phase diagram of D_2S to 70 GPa in diamond anvil cells using confocal micro-Raman spectroscopy. The results show the formation of "polymeric" D_2S (phase V) at 30 GPa at 300 K, analogous to "symmetric" ice-X. The formation of proton symmetrized D_2S is evident by the characteristic single Raman peak at 460 cm^{-1} for symmetric bending/stretching vibrational mode, analogous to that of ice X at 730 cm^{-1} at 76 GPa. At low temperatures, we also found the proton-ordering transitions to phase IV' and VI, both of which transform to phase V at 40 GPa at 100 K. The present results indicate higher chemical stability of D_2S in contrast to the previously suggested decomposition of H_2S above 30 GPa.

[1]The present study has been performed in support of National Science Foundation, Division of Materials Research (Grant No. 1203834) and CDAC.

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Date submitted: 09 Nov 2016 Electronic form version 1.4