

Abstract Submitted
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Dielectric Response and Heat Capacity Measurement of Ammonia Borane (NH_3BH_3) N. KAUR, O. GUNAYDIN SEN, A. HARTER, R. VASIC, J.S. BROOKS, N.S. DALAL, Florida State University and NHMFL — Ammonia Borane (NH_3BH_3), henceforth AB, has attracted a lot of interest recently because of its potential as a hydrogen storage material. It is known to exhibit a solid-solid phase transition at $T_P \sim 225$ K but the underlying mechanism is unclear. AB being a classical example of donor-acceptor complex, a high dipole moment is expected in the solid, with a probable ferroelectric or antiferroelectric behavior¹. We thus carried out dielectric measurements on AB using an ac impedance bridge technique over a temperature range of 200–250 K, and found a dielectric transition at 225 K. The dielectric constant was measured at 100 Hz, 1 kHz and 10 kHz, and was calibrated against standard materials². It is found to decrease with increase in frequency. We also observed the hysteresis at 10 kHz frequency using a ramping rate of 0.25 K/min. The hysteresis behavior is consistent with an antiferroelectric transition at 225K. The transition mechanism was studied also by specific heat measurements, clearly indicating a first-order transition, with a half width at half height of 0.3 K, in contrast to literature values of 10-K. Details of sample preparation, experimental procedure and data analysis will be explained in the presentation. [1] Weaver et al, *J. Chem. Phys.* 1958, 29, 1-2. [2] Bull. Acad. Sci. USSR, *Phys. Ser.* 1960, 24, 1327.

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