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Vibrational and Thermal Properties of Ammonia Borane supported on Polyacrylamide: Composites and Electrospun Fibers RADHIKA GANGINENI, LAUREN WARE, SUYING WEI, OZGE GUNAYDIN-SEN, Lamar University — We investigated the phase transition and decomposition properties of Ammonia Borane (NH_3BH_3) blended with polyacrylamide (M_n~150,000) which is a potential hydrogen storage system. The heat capacity measurements over a temperature range of 180–300 K exhibited an anomaly at around ~223 K, indicating a first-order structural phase transition. The transition enthalphy and entropy showed a decrease by increasing the polymer content in the composites and the phase transition was supressed in the fibers. Those changes could be due to the interaction between polyacrylamide and NH_3BH_3 after blending. The supression of the phase transition in the fibers could be attributed to the possible changes in bonding and disturbance in dihydrogen bonding network of NH_3BH_3. Our deyhdrogenation studies between 300-570 K revealed enhanced kinetics. Activation energies were calculated quantitatively and showed a significant decrease after mixing with the polymer, specifically for the electrospun fibers E_a dropped from about 140 kJ/mol to 67 kJ/mol. The improved kinetics was also supported by infrared measurements.

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