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Stability Studies of Aluminum Hydride XIA TANG, BRUCE LAUBE, United Technologies Research Center, DONALD ANTON, Savannah River National Laboratory, SON-JONG HWANG, Div. of Chem. and Chem. Eng., California Institute of Technology, ROBERT BOWMAN, Jet Propulsion Laboratory, California Institute of Technology, UNITED TECHNOLOGIES RESEARCH CENTER COLLABORATION, SAVANNAH RIVER NATIONAL LABORATORY COLLABORATION, DIV. OF CHEM. AND CHEM. ENG., CALIFORNIA INSTITUTE OF TECHNOLOGY COLLABORATION, JET PROPULSION LABORATORY, CALIFORNIA INSTITUTE OF TECHNOLOGY COLLABORATION —
Aluminum hydride has attracted research attention recently as a promising hydrogen storage material due to its high gravimetric, volumetric storage capacity and very low enthalpy. AlH3 forms several phases, all of which are sensitive to moisture. In this study, the discharge kinetics of a stabilized form of alpha aluminum hydride newly synthesized was evaluated. Its desorption kinetics were measured in the temperature range of 60-120°C at one atmosphere of hydrogen pressure. The material was stable at ambient temperature and no significant dehydrogenation was observed at 60°C after 70 hours. Approximately 10 wt% hydrogen was rapidly (quantify in wt%/min.) released at 100°C with no additional catalization. The activation energy for desorption was measured at 97.0 KJ/mole H2. The surface and bulk characterization methods Auger, SEM, XRD, and solid state NMR were used to investigate the mechanism of stabilization.

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