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NaAlH4 Mixed with Carbon Nanotubes, Fullerene, and Titanium to Yield the Lowest Temperature for Hydrogen Desorption. JENNIFER HILDEBRAND, PATRICK MCFADDEN, SANGA KIM, TABBETHA DOBBINS, Rowan University, Dept. of Physics Astronomy — Recent research in hydrogen storage has improved dehydrogenation methods with solid-state compounds. NaAlH4 is a complex hydrides which release hydrogen at a lower temperature making the compound a great candidate for hydrogen storage. However, a catalyst should be combined with NaAlH4 to release the lowest desorption temperature. Prior research showed that interaction of NaAlH4 with nanotube or fullerene effectively weakens the Al-H bonds causing hydrogen desorption at lower temperatures. In the present study, NaAlH4 is ball milled with three of these catalysts: titanium, carbon nanotubes and fullerene and the milling time is varied from 10 to 30 minutes to compare the dehydrogenation rates in each setup. The phase structures were identified using the X-ray diffraction. Of these catalysts, the fullerene yielded the most interesting result showing nanostructuring of the hydride during ball milling. The possibility of "shot peening" of the NaAlH4 by the fullerenes is explored.

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