

Supplementary Information

Enhanced Hydrogen Storage Properties of LiAlH₄ Catalyzed by CoFe₂O₄ Nanoparticles

Ziliang Li, Fuqiang Zhai, Qi Wan, Zhaojiang Liu, Jiawei Shan, Ping Li, Alex A.

Volinsky, Xuanhui Qu

Firstly, about 2.0g pure LiAlH₄ was milled in a high-energy modeled QM-3B Spex mill with a ball to powder weight ratio of 20:1 at the rate of 1200 rpm for 30 min. And then the milled LiAlH₄ was mixed with CoFe₂O₄ nanoparticles by using a mortar (120mm, agate) in the glove box in order to prevent the temperature increasing and guarantee the homogeneity of mixture. After that, 0.3g mixture was loaded into PCT equipment and then heated at 100 °C under vacuum condition for 2h. Finally, the phase structure of heated sample was detected by XRD. As shown as the following XRD figure, there are the same byproducts existed (Li₃AlH₆, Fe₃O₄, LiFeO₂, etc.) with the 1, 2, 3 and 5 mol% CoFe₂O₄ + LiAlH₄ ball milling samples after dehydrogenation, indicating that the increasing temperature inside the milling vial can facilitate the reaction between LiAlH₄ and CoFe₂O₄. In addition, the collision could not serve as the driving force for the reaction between LiAlH₄ and oxide, which are reported in the previous reports (*J. Phys. Chem. C*, 2011, **115**, 13088-13099).

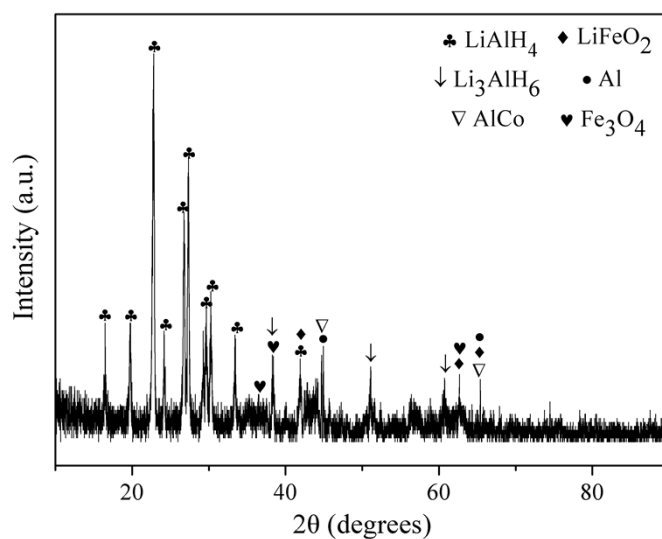


Figure S1. XRD pattern for the as-milled LiAlH₄ doped with CoFe₂O₄ by using hand-milling method.