





Fabrication of ball-milled MgO–Mg(OH)₂-hydromagnesite composites and evaluation as an air-stable hydrogen storage material

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Highlights

- Successful fabrication of air-stable hydrogen storage Mg-based composite.
- Adsorption occurs in bulk rather than on the surface.
- Reduction of structural defects decreases the adsorption capacity.
- Prolongated milling does not imply more structural defects.

Abstract

A phase stability map of metallic magnesium powder, exposed to environmental conditions for 12 months (Mg-12M) and subjected to different high-energy ball-milling speeds and milling times, was constructed. Mg-12M-160 [$\frac{1}{2}$ MgO- $\frac{1}{3}$ Mg(OH)₂- $\frac{1}{6}$ hydromagnesite] and Mg-12M-640 [$\frac{1}{4}$ MgO- $\frac{5}{8}$ Mg(OH)₂- $\frac{1}{8}$ hydromagnesite] composites were obtained changing the milling conditions. The