Hydrogen sorption properties of the composed system calcium hydride – magnesium boride.

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Hydrogen is considered the clean fuel and energy carrier of the future. Once it has been produced, hydrogen can store energy in chemical form and render it back through combustion in fuel cells or internal combustion engines. The principal hurdle to the development of a hydrogen-based economy is the possibility to store hydrogen in a safe, efficient and economically competitive way [1]. Traditionally, hydrogen is stored as a compressed gas in high pressure vessels, or as a liquid at ambient pressure in cryogenic systems, both the methods showing high energy demand and critical safety issues. An alternative safer way to store hydrogen is based on the use of nanostructured materials [2] with high specific surface area, which can absorb/release hydrogen in controlled temperature and pressure conditions. Among these materials, complex hydrides [3], light metals hydrides [4] and composites obtained by their combination (the so called "reactive hydrides composites" RHC [5,6]) are under considerations both for vehicular (500 km driving range) and stationary applications, due to their high hydrogen gravimetric capacity. In this frame we present some preliminary results obtained from the experimental study of the composed system calcium hydride – magnesium boride, CaH_2 – MgB_2, as a potential energy storage medium.

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