# MAGNESIUM NANOCOMPOSITES FOR INNOVATIVE HYDROGEN STORAGE TANK

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Abstract text

Mechanical treatment of $MgH_2$ and in particular ball milling demonstrated to enhance hydrogen mobility and is suitable to add a catalyst resulting in faster kinetics of hydrogen absorption and desorption reactions. Application of solid compounds in tank for hydrogen storage requires suitable systems for heat management. It has been demonstrated that filling cylindrical tank with powders is detrimental for its continuous operation. The powder packs and sinters with increasing number of cycles and gas could not flow through it causing a reduction of mass of material, which reacts with hydrogen. Consequently the storage capacity of the system decreases and kinetics become slower. In order to enhance heat management and gas contact the powder could be compressed in the form of pellets. Other agents, in particular carbon-based materials, for enhancing thermal conductivity, can be compacted with mixtures of magnesium hydride and catalyst. The pellets show improved properties in terms of heat exchange and better stability to cycling but a continuous increase of their dimensions took place upon repeated cycling. In this work it is reported the study performed to improve the preparation of compacted powder systems by a procedure which includes the deposition of a thin layer of a metal on the surface of the pellet able to reduce the effects of cycling and to obtain a more stable system to be applied in tank for hydrogen storage. Kinetics of reaction and microstructure have been studied with a volumetric Sievert's type apparatus and with Optical and Scanning Electron Microscopy respectively.

References

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