

NaAlH₄/CARBON COMPOSITES FOR REVERSIBLE HYDROGEN STORAGE

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Hydrogen based economy would enable energy smoothing from renewable sources and would replace fossil fuels [1]. One of the biggest hindrances of achieving a hydrogen based economy is the storage of hydrogen, where pressurised and liquefied hydrogen have a multitude of problems [2]. Chemically bound hydrogen in NaAlH₄ is a perspective solution for hydrogen storage applications. Alas, the hydrogen release temperature is too high and hydrogen storage reversibility is hindered by the segregation of decomposition products in case of pure NaAlH₄ [3].

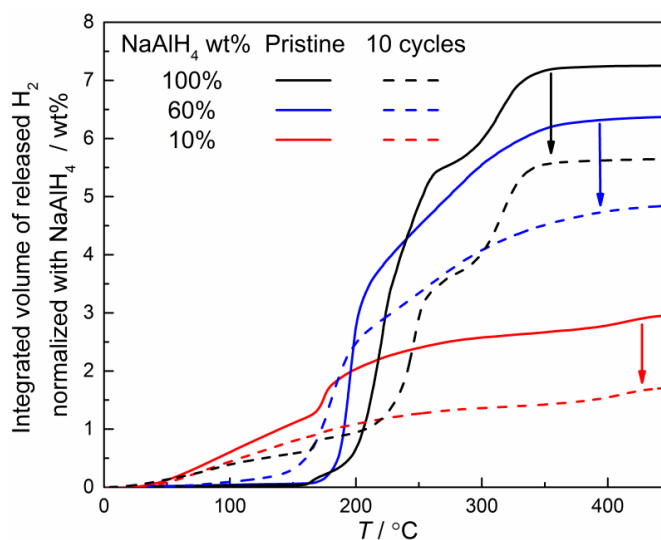


Fig.1 H₂ evolution from NaAlH₄/carbon composite materials before and after cycling.

Nanoconfinement of various wt% of NaAlH₄ has been achieved by deposition of NaAlH₄ onto/into a microporous carbon material. Multiple dehydrogenation/hydrogenation cycles have been applied to the investigated materials to ascertain the capability of nanoconfined NaAlH₄ to reversibly store hydrogen. The presence of bulk crystalline NaAlH₄ and its decomposition products have been determined by X-ray diffraction before and after dehydrogenation/hydrogenation cycling [4].

References

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