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Reversible Hydrogen Storage Characteristics of Catalytically Enhanced Ca(Li)-nMg-B-N-H System[1] SESHA SRINIVASAN, Tuskegee University, DERVIS EMRE DEMIRCAK, University of South Florida, PRAKASH SHARMA, Tuskegee University, GOSWAMI YOGI, ELIAS STEFANAKOS, University of South Florida — The aim of the present investigation is to study the synergistic effects of multi-walled carbon nanotubes, Nb_2O_5 and other catalysts for reversible hydrogen storage characteristics of Ca(Li)-nMg-B-N-H systems. Multinary hydride using light weight, high capacity hydride compounds such as $Ca(BH_4)_2$, $LiBH_4$, $LiNH_2$, nanoMgH_2 in 3:1:8:4 composition was synthesized using high energy planetary milling under Ar/H_2 ambient. Various nano additives and bi-metallic catalysts were added in a very small concentration with the host hydride (Ca)Li-nMg-B-N-H. The TGA and DSC results demonstrated that the catalytically enhanced Ca(Li)-nMg-B-N-H with hydrogen release at lower temperatures when compared to the pristine systems such as either Ca-Li-B-H or Ca-Li-Mg-B-H. Analyses of metrological characterization using XRD, SEM and have revealed the effectiveness and the role of the catalytic nanoparticles and their enhanced reversible hydrogen storage behavior on the host hydride matrix. The mass spectrometric investigations employing RGA on these nanocrystalline, multi-component hydride systems exhibit the release of hydrogen in major proportion (∼80-90%) as compared to previously attributed ammonia.

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