

บทคัดย่อภาษาอังกฤษ

Addition of multi-wall carbon nanotube (MWCNT) and NaAlH₄ into nanoconfined LiBH₄-PcB (poly (methyl methacrylate)-co-butyl methacrylate) for improving thermal stability and reducing LiBH₄/PcB interaction is proposed. The greater the amount of gases desorbed due to polymer (PcB) degradation, the less the thermal stability of polymer host. During dehydrogenation of nanoconfined LiBH₄-PcB, combination of gases due to PcB degradation is 64.3 % with respect to H₂ content, while those of nanoconfined samples doped with MWCNT and NaAlH₄ are only 9 and 7.9 %, respectively. The LiBH₄/PcB (i.e., B---OCH₃) interaction is quantitatively evaluated by FTIR technique. The more the ratio of peak area between $\nu(\text{B-H})$ (from LiBH₄) and $\nu(\text{C=O})$ (from PcB), the lower the LiBH₄/PcB interaction. It is found that by adding small amount of MWCNT and NaAlH₄, this ratio significantly increases up to 78 %. This is in agreement with B 1S XPS results, where the relative amount of B_xO_y (x/y=3) to LiBH₄ decreases after adding MWCNT and NaAlH₄ into nanoconfined LiBH₄-PcB. It should be remarked that significant improvement of thermal stability and decrease of LiBH₄/PcB interaction after adding MWCNT and NaAlH₄ into nanoconfined LiBH₄-PcB result in considerable amount of hydrogen release and uptake as well as hydrogen reproducibility during cycling. However, the dispersion of MWCNT is still one of the most critical factors to be concerned due to probably its hindrance for hydrogen diffusion.