Abstract

In this study, the $LiNH_2$–MgH_2 (2:1.1) complex hydride system (Li–Mg–N–H is investigated in terms of hydrogen ab/desorption kinetics and the concomitant NH_3 emission levels. By selecting more intense ball milling parameters, the hydrogen ab/desorption kinetics were improved and the NH_3 emission reduced. However, it is shown that NH_3 emission cannot be completely eliminated during ball milling. Single walled carbon nanotubes (SWCNTs) and 20 wt.% Ru doped SWCNTs are utilized as catalysts to study their effects on NH_3 emission and kinetics characteristics of the Li–Mg–N–H system. The SWCNT doped sample did not show any kinetics improvement, whereas the SWCNT-20Ru doped sample showed similar kinetics performance as that of the base sample. More importantly, the presence of SWCNT increased the NH_3 emission as compared to the base sample. On the other hand, SWCNT-20Ru doping reduced the NH_3 emission compared to the SWCNT doping, but did not eliminate it completely. As revealed from the mass spectrometry signals, the SWCNT-20Ru catalyst starts to decompose NH_3 at a temperature as low as 200 °C.

Citation

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