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Reversible hydrogen storage in LiBH4/CaH2 with NbF5. JAE-HAG LIM, JAE-HYEOK SHIM, YOUNG-SU LEE, YOUNG WHAN CHO, Korea Institute of Science and Technology, JOONHO LEE, Korea University — Reversible hydrogen storage properties of 6LiBH4 + CaH4 composite have been investigated. 6LiBH4 + CaH4 composite with catalytic additives have been prepared using high-energy ball milling. Among various catalytic additives, the addition of NbF5 exhibits the lowest dehydrogenation temperature. During dehydrogenation, this composite is decomposed into LiH and CaB6 releasing about 9 wt pct hydrogen. The van't Hoff plot from the equilibrium pressures measured at different temperatures predicts that the equilibrium temperature under 1 bar of hydrogen is 582 K and the reaction enthalpy change is 56.5 kJ/mol H2. This is consistent with the results of thermodynamic calculation. Rehydrogenation of this composite is accomplished at 723 K under 100 bar of hydrogen after dehydrogenation, presenting a reversible hydrogen capacity of about 9 wt pct.

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