

Phase Equilibria of Li-H System and Rate of Formation of LiH

Yu Suzuki^{C,S}, Noritaka Ouchi, Osamu Takeda and Yuzuru Sato

*Tohoku University, Department of Metallurgy, Graduate School of Engineering, Sendai, Miyagi, Japan
b1tm5016@s.tohoku.ac.jp*

Hydrogen energy is extensively developed as a clean energy since the energy efficiency is high compared with other energy sources and it emits no greenhouse gas. The authors are developing a new strategy and transport system for hydrogen by using LiH. This system mainly consists of three processes: (1) synthesis of LiH by hydriding Li, (2) hydrogen production by hydrolysis of LiH, (3) reproduction of Li by electrolysis of LiOH as the byproduct of hydrolysis. In this study, the synthetic process of LiH was investigated thermodynamically and kinetically. For the experiment, a tightly sealed thermobalance was developed. Li metal (0.2~3g) is loaded into a crucible made of pure iron. The crucible is suspended from the electric balance by iron wire. The change in sample weight is recorded. The atmosphere is H₂ (0.1MPa). The weight slightly increased with increasing temperature until 650°C. This may be due to hydrogen dissolution into molten Li. Increasing the temperature further, the weight drastically increased. This suggests that LiH was rapidly formed by the reaction of Li and H₂. This temperature is close to the melting point of LiH. It is estimated that the fresh surface of Li emerged due to the fusion of LiH on the interface and the reaction proceeded smoothly. As described above, the formation of LiH was observed as a function of the thermal conditions.