

Measurement system of effective thermal conductivity for small amount solid-state hydrogen storage materials

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Solid-state hydride materials are accompanied by a large heat of reaction during adsorption-desorption process in hydrogen storage. As a result, the hydrogen sorption kinetics can be strongly affected by heat management in hydrogen vessels. Therefore, there have been many reports to evaluate the effective thermal conductivity (ETC) in experimental or theoretical approaches. Existing measurement system of ETC requires a large amount of sample. However it is not easy to prepare the large amount of sample in the initial development stage. To address this issue, we developed small measurement system of the ETC. This small measurement system of the effective thermal conductivity using a minimum amount of solid-state storage materials in the initial development stage. The performance of the measurement system developed in this work was evaluated using LaNi₅ as a reference material which the ETC is well known. Finally, we will discuss the effective thermal conductivities of powder and pellet types the magnesium hydride.