

## Catalytic reaction of Liquid Organic Hydrogen Carriers for comparing kinetic reaction rate and hydrogen storage capacity

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Among various hydrogen storage methods, a liquid organic hydrogen carrier (LOHC) is an organic compound which is capable of stably storing and releasing hydrogen in a liquid form. To date, developed materials are homocyclic compounds which is consisted of C-H bonds and heterocyclic compounds containing N atom. Representatively, methylcyclohexane (MCH) developed in Japan, Dibenzyltoluene (DBT) developed in Germany, and N-ethylcarbazole (ECZ) developed in America. According to reports, homocyclic compounds have a low reaction rate in hydrogen storage and release, but heterocyclic compounds are known to have a fast reaction rate. But there has not been experimentally proven how fast and slow compared to what substances under specific conditions. In this study, various organic compounds that can be used as LOHC were selected, and the (de)hydrogenation reaction rate of LOHC was evaluated under the same catalyst and experimental conditions. As a result, in all of the (de)hydrogenation reactions, homocyclic compounds tended to have a better reaction activity than heterocyclic compounds, indicating a different trend from previous reports.