

Hydrogenation of N-heterocyclic compound via hydrogen activation on metal oxide nanosheets for hydrogen storage

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For realization of the hydrogen economy, which is based on hydrogen as an energy carrier, significant number of related researches have been reported. In this research stream, liquid organic hydrogen carrier (LOHC) system could be adopted as an efficient technology for delivering hydrogen to utilization spots. In LOHC system, hydrogen is reversibly stored and released through catalytic hydrogenation and dehydrogenation reaction. In this work, we designed a catalyst that has fast hydrogenation activity at lower temperature (100–130 °C) using cobalt based oxides as an efficient catalytic support. Ru nanoparticles were supported on it through subsequent reduction with sodium borohydride as a reducing agent, and the Ru catalyst shows higher activity than commercial Ru/Al₂O₃ catalyst.