

Catalytic decomposition of ammonia by Ru/La(x)-Al₂O₃ (x=0, 1, 5, 10, and 50 mol%)

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Owing to the facile transportability and high hydrogen storage density (17.7 wt% and 108 g/L @ 0.86 MPa and 20 °C), ammonia has been considered as an attractive hydrogen energy carrier. In addition, ammonia decomposition releases no CO_x, and the spent-fuel N₂ can be regenerated via the well-established Haber-Bosch process. Due to the high kinetic barrier, however, the NH₃ dehydrogenation needs high temperature. It is therefore necessary to develop highly active and thermally stable catalysts for practical applications. We investigated Ru-based catalysts supported on La-doped alumina, and found that the as-developed catalyst showed superior activities at 550 °C with the conversion of > 99.5%. The influence of La doping was further assessed as a function of La concentration.

Key words : Ammonia dehydrogenation, Hydrogen storage, Catalyst, Ru, La doped alumina, LaAlO₃