

論文 / 著書情報
Article / Book Information

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Title(English)	Decomposition of ammonia by anion-vacancy site of nitride-supported Ni-based catalysts
著者(和文)	小笠原 気八
Author(English)	Kiya Ogasawara
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論文要約

論文題目 Thesis Title	Decomposition of ammonia by anion-vacancy site of nitride-supported Ni-based catalysts (窒化物担持ニッケル触媒のアニオン欠陥によるアンモニア分解)
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要約

Ammonia decomposition reaction has been regarded as a promising technique for on-site hydrogen production toward the realization of hydrogen energy society. Transition metal (e.g. Ru, Fe, Co, Ni) supported on oxide is typically used as a catalyst for ammonia decomposition reaction, especially Ni-based catalysts are suitable for practical application due to its high dehydrogenation ability and cost advantage. However, the ammonia decomposition performance of Ni-based catalysts is still not sufficient under relatively low-temperature region (400–500°C). The anion vacancy site (e.g. O^{2-} , S^{2-} , H^{-} vacancy) over various support materials (e.g. oxide, sulfide, hydride) often functions as an adsorption and/or active site for various catalytic reactions. From this point of view, nitrogen-containing materials with chemically active nitrogen species have a significant potential as catalyst support for ammonia decomposition because ammonia molecule is likely to adsorb on their nitrogen vacancy site. In this study, nitrogen-containing materials such as $CaNH$, $h-BaTiO_{3-x}N_y$, rare-earth nitrides were applied as support material of Ni catalyst in ammonia decomposition. We demonstrated that these materials significantly enhance the ammonia decomposition performance of Ni-based catalysts, and the anion vacancy site at the Ni-support interface plays a key role in the activation of the ammonia molecule.