

Promotion of CO₂ methanation activity over Ni_{1-x}Ca_xTiO₃/r-Al₂O₃ catalysts

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The atmospheric environment caused by greenhouse gases is very serious and we have proposed greenhouse gas reduction targets through the Paris 2015 Climate Change Convention. Korea has also proposed to cut its greenhouse gas emissions by 37% by 2030, so it is necessary to reduce the atmospheric carbon dioxide concentration and take measures for their use. Converting CO₂ into high value-added materials such as methane or methanol in a variety of ways is very useful in industry and the environment. Therefore, this study developed a high efficiency catalyst for carbon monoxide thermal methanation reaction, which is well known as the triple chemical reaction. Using perovskite NiTiO₃ as a base catalyst, Ca was added to improve the methanation performance. The physicochemical properties of the synthetic catalysts were confirmed by XRD, BET and CO₂-TPD. The reaction proceeded to 200–500 °C and the highest feed conversion was obtained at 400 °C.