

Effect of Fe on $\text{La}_{1-x}\text{Sr}_x\text{Ni}_{1-y}\text{Fe}_y\text{O}_3$ Perovskite Catalysts for Steam CO_2 Reforming of methane

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Hydrogen or mixture of H_2 and CO (synthesis gas) are used extensively in a wide range of industrial process. Steam CO_2 reforming of methane (SCR) is a remarkable way to produce synthesis gas which can be a feedstock for GTL process. Recently the design of compact reformer has been a hot issue for off-shore MeOH - FPSO & GTL - FPSO applications.

In this study, perovskite type catalysts with substitution of Fe in B-site were prepared by modified EDTA-cellulose method. Generally A is rear earth or alkali metal ion, and B is the transition metal ion. The prepared perovskite type catalysts were characterized by various techniques such as N_2 physisorption, CO chemisorption, TPR, XRD, SEM, TEM-EDS and TG analysis. Commercial simulation package was used to estimate optimum experimental conditions for SCR of methane reaction. The simulation results were compared with the experimental results under the tested conditions.

It was found that $\text{La}_{0.95}\text{Sr}_{0.05}\text{Ni}_{0.3}\text{Fe}_{0.7}\text{O}_3$ catalyst shows higher catalytic performance and stability than the other catalysts in the SCR of CH_4 at the reaction conditions of 900°C , 21 bar and molar ratio of $\text{CH}_4:\text{CO}_2:\text{H}_2\text{O} = 1 : 0.6 : 1.63$.