

Catalytic performance of the perovskite-like NiSrOx on the modified SiC support for the combined steam reforming of CH<sub>4</sub> and CO<sub>2</sub>

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The nickel containing perovskite-like (La)NiSrOx catalysts on the modified SiC support were investigated for the combined steam reforming reaction of CH<sub>4</sub> with CO<sub>2</sub>. The (La)NiSrOx perovskite-like catalysts showed a lower sintering character of nickel particles and a lower coke formation. The SiC support was previously modified with Al<sub>2</sub>O<sub>3</sub> or MgAl<sub>2</sub>O<sub>4</sub> component to enhance the dispersion of (La)NiSrOx perovskite-like particles. At optimum content of Al<sub>2</sub>O<sub>3</sub> or MgAl<sub>2</sub>O<sub>4</sub> modifier on SiC support, the catalyst showed an enhanced CO<sub>2</sub> conversion by increasing the adsorption properties of CO<sub>2</sub> on the basic La or Sr oxides. The optimum concentration of modifier was found to be around 10wt% Al<sub>2</sub>O<sub>3</sub> and MgAl<sub>2</sub>O<sub>4</sub> on SiC support. The suppressed aggregation of nickel-containing particles was also attributed to the strong interaction between Ni and modifier. The different catalytic behaviors were explained by characterizing the surface properties such as Ni particle sizes and basic properties through XRD, XPS, BET and TEM analyses.