

Performance of Ce- and Ni-added LaFeO₃ perovskite catalysts in the steam reforming of methane:
Effect of heat treatment temperature

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Ce- and Ni-added LaFeO₃ perovskite catalysts (LCFN) were prepared by Pechini method, followed by heat treatment at various temperatures from 500°C to 900°C, and their performance in the steam reforming of methane (SRM) was investigated. The catalysts were characterized by ICP-AES, N₂-physisorption, XRD and elemental analysis (EA). In XRD patterns of the prepared catalysts, it was found that the well-crystallized perovskite structures were formed when LCFN perovskite catalysts were treated at temperatures higher than 600°C. BET surface area of LCFN decreased with an increase in the heat treatment temperature, but the crystallite size of LCFN showed an opposite trend. LCFN showed higher methane conversions and hydrogen yields compared with the case of Ni-added LaFeO₃ (LFN). In particular, LCFN-700, which was heat-treated at 700°C, showed the highest methane conversion and hydrogen yield and maintained the initial activity under a severe reaction condition, i.e. H₂O/C = 1 and temperature = 700°C for 20h.