

Rh doped SYT perovskite properties and its catalytic performance in partial oxidation of methane to syngas

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We prepared Rh doped Sr 0.92Y0.08TiO_{3-δ} (SYTRh) perovskite by the Pechini method, where and as small as 2 mol% Rh was replaced in titanium of SYT catalyst, evaluated for partial oxidation of methane (POM) to syngas. It showed an excellent and stable catalytic performance in thermal cycle from 600oC to 900oC and stability. The physicochemical properties were analyzed including X-ray diffraction (XRD), transmission electron microscopy (TEM), X-ray photoelectron spectroscopy (XPS), and CO-chemisorption. These characteristic analysis results showed that Rh particles in SYT structure were exsolved onto the surface and played an important role as catalytic active sites. The evaluated particle size of Rh on SYT surface was nano dot without agglomeration and it showed high metal dispersion and turnover frequency (TOF) in the POM regarding lower Rh doping amount, which was also closely related to the activation energy of the catalysts.