In Situ Glycine–Nitrate Combustion Synthesis of Ni–La/SiO_2 Catalyst for Methane Cracking

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ABSTRACT
Ni–La catalyst supported on SiO_2 (Ni–La/SiO_2) synthesized using in situ glycine–nitrate combustion was analyzed for catalyst dispersion at various catalyst-to-support ratios and support surface areas. Catalytic activity of the catalyst was assessed for methane cracking. The catalyst with higher support loading had a better catalyst dispersion. The use of a support with high surface area also improved catalyst dispersion. Ni–La/SiO_2 B synthesized using a support with high surface area have a higher catalyst dispersion than that of Ni–La/SiO_2 A with a support of low surface area. As a result, Ni–La/SiO_2 B had a better methane conversion (the maximum of ~60%) than that of Ni–La/SiO_2 A (~40%) and offered a higher H_2 yield. Moreover, Ni–La/SiO_2 B was found to be active for carbon formation. Nevertheless, the catalyst remained catalytically active for methane cracking without deactivation.

KEYWORDS
Amino acids; Binary alloys; Catalyst activity; Catalytic cracking; Combustion synthesis