

Preparation and Properties of a Nickel -based heterogeneous catalyst supported on the SiC -Al₂O₃ bead that has a Nanowire Structure

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The conventional mesoporous catalyst supports such as alumina, silica and titania have been widely used as commercial catalyst supports for synthetic fuel production. But the significant reduction of surface area of mesoporous support materials due to the sintering still found in the conventional catalyst supports. Silicon carbide and aluminum oxide composites are the prominent candidates among various catalyst support materials. However, for excellent catalytic performance a novel synthetic method for Ni/SiC -Al₂O₃ heterogeneous catalyst with a large specific surface area is still crucially required to develop. The aim of this study is to develop a new type of highly -dispersed nickel metal catalysts supported by SiC -Al₂O₃ nanowire composite supports. For this study, the nickel -based catalysts supported by SiC -Al₂O₃ nanowire composites were prepared via modified sol -gel process assisted by supercritical carbon dioxide and subsequent heat -treatment for application of catalytic reactions, particularly, in GTL processes. The microstructural and morphological evolutions of the highly porous SiC -Al₂O₃ catalyst supports during formation of nanowires were also systematically investigated.