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Advanced Materials Science Research

Effect of cobalt catalyst confinement in carbon nanotubes support on Fischer-Tropsch synthesis performance

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Abstract

Pre-treating the multi-walled carbon nanotubes (CNTs) support by refluxing in 35 vol% nitric acid followed by heating at the temperature of 600 to 900 °C resulted in the formation of defects on the CNTs. Increasing the temperature of the pre-treatment of the CNTs from 600 °C to 900 °C, enhanced the fraction of cobalt-oxide nanoparticles encapsulated in the channels of CNTs from 31% to 70%. The performance of Co/CNTs in Fischer-Tropsch synthesis (FTS) was evaluated in a fixed-bed micro-reactor at a temperature of 240 °C and a pressure of 2.0 MPa. The highest CO conversion obtained over Co/CNTs.A.900 was 59% and it dropped by ~3% after 130 h of time-on-stream. However, maximum CO conversion using Co/CNTs.A.600 catalysts was 28% and it decreased rapidly by about 54% after 130 h of time-on-stream. These findings show that the combined acid and thermal pre-treatment of CNTs support at 900 °C has improved the stability and activity of the Co/CNTs catalyst in FTS.

Publications

Omid Akbarzadeh, Noor Asmawati Mohd Zabidi, Yasmin Abdul Wahab, Nor Aliya Hamizi, et. Al Effects of Cobalt Loading, Particle Size, and Calcination Condition on Co/CNT Catalyst Performance in Fischer–Tropsch Reactions(2019), Nanocatalysis and Symmetry in Chemistry

Nor AliyaHamizi, Mohd RafieJohan, Zaira Zaman Chowdhury, Yasmin Abdul Wahab, YarubAl-Douri, Asmalina Mohamed Saat, Omid Akbarzadeh Pivehzhania Optical structure modification induced by lattice strain in Mn-doped CdSe QDs(2018), Journal of Optical Materials

IbdalSatar, MostafaGhasemi, Saad A.Aljlil, Wan Nor Roslam WanIsahak, Omid Akbarzadehh, et. Al, Production of hydrogen by Enterobacter aerogenes in an immobilized cell reactor(2017), International Journal of Hydrogen Energy

M.R. Davari, S. Bayat Kazazi, O. Akbarzadeh Pivehzhani Nanomaterials: Implications on Agroecosystem(2017), Journal of Nanotechnology

Biography

Omid Akbarzadeh Pivehzhani is working with Nanotechnology and Catalysis Research Centre since 2016. His main research area is heterogeneous catalysis and catalytic reaction engineering. He has spent 10 years in academic-industrial projects as a research officer and post-doctoral. He has worked 5 years in the oil and gas industry as a chemical engineer. He developed advanced smart catalysts, especially for the oil and gas industries. He has contributed to two PETRONAS Research Sdn Bhd industrial catalyst projects and worked on an international Airbus R&D project in NANOCAT. Currently, he is the PI of the graphene catalyst project at Hokkaido University in Japan, project member of FRGS grant in UTP and assigned to the NANOCAT center project.

Citation: Omid Akbarzadeh Pivehzhani, Effect of cobalt catalyst confinement in carbon nanotubes support on Fischer-Tropsch synthesis, Annual Summit on Biomaterials and Tissues, Webinar, June 08, 2020, 10