Fall 9-17-2018

The Flow Reactor Technology as a Modern Synthetic Tool for Preparation of Pd/Fe3O4 Nanoparticles as a High Efficient Magnetic Catalyst for CO Oxidation

Hany A. Elazab
The British University in Egypt, hany.elazab@bue.edu.eg

J Chem Eng Process Technol 2018, Volume 9
DOI: 10.4172/2157-7048-C3-018

4th International Conference on
CHEMICAL ENGINEERING
September 17-18, 2018 | Vancouver, Canada

The flow reactor technology as a modern synthetic tool for preparation of Pd/Fe_3O_4 nanoparticles as a high efficient magnetic catalyst for co oxidation

Hany A Elazab, Kendra W Brinkley, B Frank Gupton and **M Samy El-Shall**
Virginia Commonwealth University, USA

A sustainable and efficient microwave-assisted reduction technique was developed to prepare active Pd/Fe_3O_4 nanoparticles as a highly efficient magnetic catalyst used for the catalytic oxidation of carbon monoxide. The method involves simultaneous reduction of the corresponding Pd $(NO_3)_2$ and Fe $(NO_3)_3.9H_2O$ under the microwave irradiation conditions using a Wave Craft's microwave flow reactor commercially known as Arrhenius One. Hydrazine hydrate was used as the reducing agent underflow reaction conditions. The Pd/Fe3O4nanoparticles have shown to exhibit high catalytic activity for CO oxidation catalysis. The catalytic activity of these materials can be attributed to the high degree of dispersion and concentration ratio of the Pd nanoparticles deposited on the surface of magnetite (Fe_3O_4) with a small particle size of 5-8 nm due to the effective microwave-assisted reduction method. These nanoparticles are further characterized by a variety of spectroscopic techniques including X-ray photoelectron spectroscopy (XPS), X-ray diffraction (XRD) and transmission electron microscopy (TEM). The investigated catalysis data revealed that palladium supported on iron oxide catalyst showed remarkable high catalytic activity towards CO-oxidation.

elazabha@vcu.edu