SYNTHESIS, PHYSICOCHEMICAL CHARACTERIZATION AND CATALYTIC ACTIVITY OF BIMETALLIC Ag-Au on ZrO$_2$-CeO$_2$ SUPPORT

Zenaida Guerra-Que$^1$, Gilberto Torres-Torres$^1$, Adib A. Silahua-Pavòn$^1$, Hermicenda Pérez-Vidal$^1$, Jorge N. Beltramini$^2$

$^1$Universidad Juárez Autónoma de Tabasco, DACB, Laboratorio de Catálisis Heterogénea, Km 1 Carretera Cunduacán-Jalpa de Méndez, Cunduacán, Tabasco, CP 86690, A. P. 24, México. $^2$ARC Centre of Excellence for Functional Nanomaterials, The Australian Institute for Bioengineering and Nanotechnology and School of Engineering, The university of Queensland, St. Lucia, QLD, 4072, Australia

The selective deposition of Au on the surface of nanoparticles of a primary oxide-supported metal has been performed by a redox method that is based on the reduction of the second metal ions with hydrogen adsorbed on the surface of first metal or with itself. The samples were characterized by X-Ray Diffraction Analysis (XRD), Transmission electron Microscopy (TEM), X-ray photoelectron spectroscopy (XPS). The catalytic performances of Ag-Au (1:1) Bimetallic supported on ZrO$_2$-CeO$_2$ were studied in catalytic wet air oxidation (CWAO) of Methyl Tert-Butyl Ether (MTBE) at 100°C and 80 bar of pure oxygen pressure. Besides the chemical nature and composition of support also had a great influence on the catalytic properties of the bimetallic catalyst. Therefore, another focus in this investigation is to study the effect of zirconia (ZrO2) and doped zirconia (ZrO2-CeO2 to 5, 10, 15 and 20 wt% CeO2 ) in the catalytic properties of this system, because of the complex interactions between them. The presence of ceria promotes the MTBE and intermediates mineralization for monometalic and bimetallic catalyst. A drastic extent of total organic carbon (TOC) removal was observed with addition of Silver on support (TOC conversions up to 98%). The rate of TOC removal was further enhanced by deposition of metallic Gold on the silver supported.

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References:


Presenting author’s email: zenaida.guerra4@gmail.com