La Laguna (Tenerife) 17-20 Junio 2016

18ª Reunión Del Grupo Especializado De Química Inorgánica

12ª Reunión Del Grupo Especializado De Química De Estado Sólido

Synthesis of Au-Cu/SBA(Ti) catalysts for photocatalytic applications

I. Barroso-Martín[1], A. Infantes-Molina[1], E. Moretti[2], A. Talon[2], L. Storaro[2], E. Rodríguez-Aguado[1], E. Rodríguez-Castellón[1].

[1] *Departamento de Química Inorgánica, Cristalografía y Mineralogía (Unidad Asociada al ICP-CSIC), Facultad de Ciencias, Universidad de Málaga, Campus de Teatinos, 29071 Málaga, Spain*

[2] *Dipartimento di Scienze Molecolari e Nanosistemi, Università Ca' Foscari Venezia, INSTM Venice Research Unit, Via Torino 155/B, 30172 Mestre Venezia, Italy*

isabel.barroso@uma.es

Since the discovery in 1972, by Fujishima and Honda, of water splitting by using TiO_2 under UV irradiation, photocatalysis has gained interest in energy and environment fields worldwide. Regarding to titania photocatalytic activity, it has been demonstrated that not only it depends on the crystalline structure, but also on particle size distribution, as a high specific surface area must be provided for the photoactive species. One of the most studied strategies comprised the use of mesoporous supports for obtaining TiO_2 species with high specific surface area which improve the pollutant molecules adsorption and their degradation. In this issue, the synthesis method is a determining step for obtaining highly active and stable photocatalysts, since it is crucial that these photoactive TiO_2 species remain confined in the internal surface of the mesoporous support and not in the pore channels nor the external surface, causing pore blockage.

In this work, it has been synthesized several Au and Au-Cu alloy photocatalysts supported on two different mesoporous supports: a non-commercial SBA-15 and a post-synthesis TiO_2 modified SBA-15 (TiSBA-15), with which a high dispersion of TiO_2 species have been achieved maintaining the SBA-15 structure. In addition, it has also been obtained highly dispersed Au nanoparticles confined in SBA-15 pore channels. The photocatalysts have been preliminary tested in the preferential CO oxidation in a H_2-rich stream (CO-PROX) at room temperature and atmospheric pressure under simulated solar light irradiation. In spite of the very low gold and copper loading (1.5 wt% and 0.5wt% respectively), the catalysts resulted active and selective in the low temperature photo-CO-PROX.

Aknowledgements

Thanks to project CTQ2015-68951-C3-3R (Ministry of Economy and Competitivenes, Spain and FEDER Funds). A.I.M. thanks the Ministry of Economy and Competitiveness for a Ramón y Cajal contract (RyC2015-17870).