

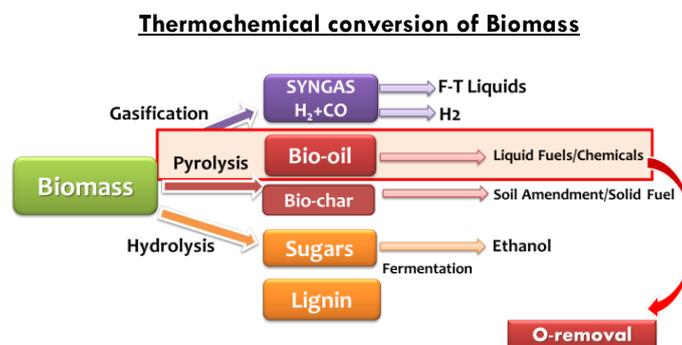
Nanocatalysts for oxygen removal from biomass derived biofuel

A. Infantes-Molina, E. Rodríguez-Aguado, D. Ballesteros-Plata, E. Rodríguez-Castellón. *Universidad de Málaga, Dpto. Química Inorgánica, Cristalografía y Mineralogía. Facultad de Ciencias. Campus Teatinos s/n, 29071 Málaga (Spain)*

Abstract

The use of bio-energy as a renewable alternative to fossil fuels is nowadays attracting more and more attention. The bio-fuel from biomass seems to be a potential energy substitute for fossil fuels since it is a renewable resource that could contribute to sustainable development and global environmental preservation and it appears to have significant economic potential. Liquid fuels can be obtained from fast pyrolysis of lignocellulosic biomass, where fast pyrolysis is a promising route because the process takes place at moderate temperatures, in absence of air and with a short hot vapor residence time. However, these liquid fuels have poor quality due to their low volatility, high viscosity, low heating value, high oxygen content and poor chemical stability. This high oxygen content is due to the presence of oxygen-containing compounds such as alcohols, aldehydes, ketones, furans and phenols. In this sense, catalytic hydrodeoxygenation (HDO) is one of the most efficient processes to remove oxygen from these liquid fuels. In this context, the catalyst design is of utmost importance to achieve a high degree of deoxygenation, and bifunctional catalysts are required to achieve high degrees of activity. Noble metal and non-noble metal based catalysts will be evaluated in HDO of model molecules in order to get further insight about the important role of the active phase. Transition metal phosphides have shown excellent catalytic performances due to their good hydrogen transfer properties that diminishes the amount of metal exposed, avoiding, as much as possible, the deactivation, and modifies the electronic density of the catalyst leading to solids that favors the HDO. In addition these phosphides show bifunctional catalytic properties (metallic sites for hydrogenation and acid sites for cracking, methyl transfer reaction, dehydration and isomerization).

Image



Recent Publications

1. Ballesteros-Plata D, Infantes-Molina A, Rodríguez-Cuadrado M, Rodríguez-Aguado E, Braos-García P, Rodríguez-Castellón E (2017) Incorporation of molybdenum into Pd and Pt catalysts supported on commercial silica for hydrodeoxygenation reaction of dibenzofuran. *Applied Catalysis A: General* 547: 86-95.
2. García-Sancho C, Cecilia JA, Mérida-Robles, JM, Santamaría González J, Moreno-Tost R, Infantes-Molina A, Maireles-Torres P (2017) Effect of the treatment with H₃PO₄ on the catalytic activity of Nb₂O₅ supported on Zr-doped mesoporous silica catalyst. Case study: Glycerol dehydration. *Applied Catalysis B: Environmental* 221: 158-168.
3. Rodríguez-Aguado E, Infantes-Molina A, Ballesteros-Plata D, Cecilia JA, Barroso-Martín I, Rodríguez-Castellón E (2017) Ni and Fe mixed phosphides catalysts for O-removal of a bio-oil model molecule from lignocellulosic biomass. *Molecular Catalysis* 437: 130-139.
4. Infantes-Molina A, Moretti E, Segovia E, Lenarda A, Rodríguez-Castellón, E (2016) Pd-Nb binfunctional catalysts supported on silica and zirconium phosphate heterostructures for O-removal of dibenzofurane. *Catalysis Today* 277: 143-151.
5. Cecilia JA, Infantes-Molina A, Sanmartín-Donoso J, Rodríguez-Aguado E, Ballesteros-Plata D, Rodríguez-Castellón E (2016) Enhanced HDO activity of Ni₂P promoted with noble metals. *Catalysis Science and Technology* 6: 7323-7333.



Biography

Dra. Antonia Infantes-Molina is a Senior researcher at the University of Malaga. Chemical Engineer (2002) and Ph in Science (2006-University of Malaga) has developed its research line in the synthesis and characterization of nanomaterials and nanocatalysts as well as their use for environmental applications. After her PhD, she has studied adsorbent materials in collaboration with Pesquisa em Separações por Adsorção, Universidade Federal do Ceará (Brasil); catalytic systems for clean fuels production in the Institute of Catalysis and Petrochemistry (ICP-CSIC) in Madrid (Spain) and NO_x catalytic removal from mobile sources and catalytic processes for CO₂ transformation in the Laboratory of Catalysis and Catalytic Processes group at Politecnico di Milano. Her current research includes catalytic hydrodeoxygenation as well as waste valorization: new catalytic formulations and new applications for ashes derived from biomass treatment.

Email: ainfant@uma.es

Notes/Comment

