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Abstract

Inside catalytic behaviour of sulfided NiMo and CoMo catalyst in the HDO of biomass feedstock

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Abstract:

Introduction: The total replacement of the fossil fuels with renewable energy sources is the challenging aim for future energetic system, for both stationary and mobile applications. As "indirect solar energy", the biomasses can play a key role for the future energetic system and for the hydrogen generation via renewable sources conversion, especially for the automotive sector, as proved by the lately attention reached by road traffic, electric vehicle concepts with batteries, fuel cells or in hybrid configurations. On this address, biomass feedstock represents the more suitable and renewable energy sources. One of the main challenging research activity regards the use of pyrolysis oil either as on-board hydrogen source or as automotive fuel. However, the crude biooil needs of further upgrading to be useful for automotive purposes. In this context, hydrodeoxygenation reactions are carried out by using HDT catalysts. An active and stable catalyst plays a crucial role during HDT processes. In respect of this, the refinery HDS catalysts such as CoMo/Al2O3 and NiMo/Al2O3 seems at the moment the most useful catalysts for the industrial purposes. Therefore, the catalytic activity of industrial CoMo and NiMo supported catalysts, in-situ pre-sulfided at 400°C, was proved in the HDT reactions of model compounds and real bio-oil. The catalytic tests were carried out at 250 350°C and 10-20atm by using a laboratory micro-plant equipped with a AISI 316L stain steel PF-reactors, connected to GC for the analysis of the composition of reactants and products. While the physical-chemical properties of samples were characterized by XRF, XRD, XPS, TG-DSC analysis and N2 physisorption.

Conclusion: A clear relationship between physical-chemical properties of catalysts and products yield have been assessed, also proving the larger carbon deposition phenomena on the surface of catalysts with a greater acidic character

Biography:

Alessandra Palella received her education at the University of Messina, obtaining M.Sc. in Industrial Chemistry. She completed her PhD in “Materials for Health, Environment and Energy” at University of Rome. She is Research Associate at the National Council of Research and she works mainly on the design and development of catalytic materials and processes for energy and environmental applications. She has published more than 15 papers in reputed journals.

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