Abstract

Title: Biofuels from bio-oils upgrading via HDO process, catalytic study with MTBE model compound

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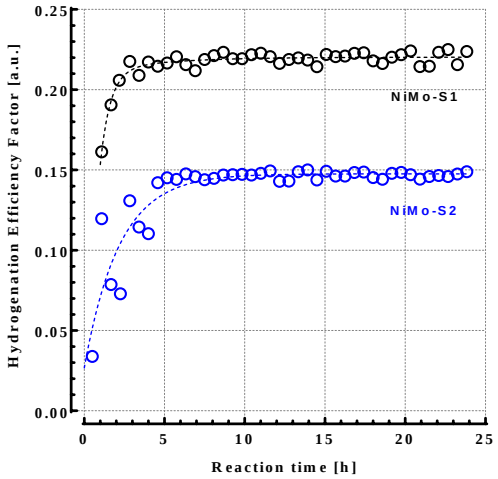
Keywords: Biofuel upgrading, MTBE, HDO process, structure-activity relationship.

I. Abstract Body

Concerns about the environment pollution and energy shortage have promoted academics to exploit fossil fuel alternatives, such as biomass [1]. In particular, crude bio-oils derived from the pyrolysis of biomasses, can represent one of the most suitable and renewable energy sources for the bio-fuel production. However, crude bio-oil upgrading is required before utilization as transportation fuels [2-3]. In fact, the high content of oxygenated molecules is responsible for several deleterious properties of these crudes as high viscosity, low volatility, corrosiveness, thermal instability and tendency to polymerize. Moreover, although ethers are one of the primary products of pyrolysis oil, the HDO of these molecules has not been fully investigated [4].
On this address, this work is aimed at highlighting the feasibility of the bio-oil upgrading process under simulated industrial conditions. Namely, a systematic study in the HDO of MTBE as model compound has been carried out by using alumina supported NiMo based catalysts, timely activated with different procedures, shedding light on the correlations between structure and reactivity. Preliminary tests show an almost complete conversion of the MTBE, with the formation of methanol as main reaction product, while the presence of methane is due to the occurrence of cracking side reaction.

II. Image:

Catalytic results of NiMo-S1 and NiMo-S2 catalysts in the HDO of MTBE.



Then, as shown in the Image, NiMo-S1 and NiMo-S2 catalysts, activated with different protocols, exhibit a diverse reaction pathway and reactivity, showing an almost progressive structure-activity relationship.

III. Reference:

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IV. Biography:

Lorenzo Spadaro, received his education at the Universities of Messina, Reggio Calabria, Turin and Rome, obtaining Ph.D. and Sc.D. in Industrial Chemistry and Chemical Engineering. Since 2000 he's been researcher of Italian National Research Council (CNR) and University Lecturer. His main research activities concern the "Design of Catalysts and Industrial Processes for Energetic and Environmental Applications". He's co-author of more than 200 technical-scientific documents, inventor of several international industrial patents and prototypes.

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