19th International Conference on
Medicinal Chemistry & Multi Targeted Drug Delivery
&
International Conference on Catalysis and Pyrolysis
November 05-06, 2018 | San Francisco, USA

Renewable jet fuel range hydrocarbons production from biomass derived α-tetralone via vapour phase hydrodeoxygenation: Catalytic effect of mesoporous Pt-Ni/HPW-SBA-16

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SBA-16, HPW supported Pt-Ni bimetallic catalysts were synthesized by co-impregnation method. On SBA-16 support finely dispersed metal oxides can be found in the external surface of mesoporous channels. Their interaction is favoured to form Pt(2.0)-Ni(8)/10wt% HPW-SBA-16 catalysts showed enhanced catalytic activity and stability. The goal of this study Pt-Ni/HPW-SBA-16 was examined as a catalyst for the catalytic hydrodeoxygenation (HDO) of α-tetralone, which is a model compound derived from lignocellulosic biomass. 93.24% and 96.43% of Cis and *Trans*-decalin was obtained at various reaction conditions. Effect of the metal weight percentage of Pt(2)/10wt% HPW-SBA-16, Ni(8)/10wt% HPW-SBA-16 and bimetallic Pt(0.5)- Ni(8)/10wt% HPW-SBA-16, Pt(1.0)-Ni(8)/10wt% HPW-SBA-16, Pt(1.5)-Ni(8)/10wt% HPW-SBA-16, Pt(2.0)-Ni(8)/10wt% HPW-SBA-16, reaction temperature (250-450°C), time (3-24h), hydrogen pressure (50 mL/min) and WHSV-1.89h^{-1} on conversion and selectivity were investigated systematically. The physiochemical properties of these catalysts were surveyed by BET, XRD, H_2-TPR, H_2-Chemisorption, NH_3-TPD, HR-TEM EDS, XPS, FT-IR, DRS-UV and ICP-OES techniques. Hydrodeoxygenation of α-tetralone into jet-fuels synthesis over the catalyst was tested in a fixed bed reactor, especially those that facilitate the removal of a ketone fragment. Standard HDO conditions permit both ketone reduction and C-O bond cleavage. The major products from HDO of α-tetralone for the active bimetallic catalysts were jet fuel hydrocarbons such as α-tetralol, *cis/trans*-decalin and tetralin. The removal of oxygen is evidenced by the production of tetralin and *cis/trans*-decalin.

Biography

Pandurangan Arumugam is a Former Head of the Chemistry Department & Founder Director, Institute of Catalysis and Petroleum Technology, Anna University, Chennai, India. He was a Visiting Professor at University of Kentucky, Lexington, KY and University of Massachusetts, Amherst, MA. He was also a Visiting Scientist at Max-Planck Institute, Munich, Germany and worked along with the Noble Laureate Prof Robert Huber. He is actively engaged in the field of catalysis, nanotechnology, biofuels, energy storage and organic synthesis. Currently 12 scholars are working for PhD Degree under his supervision in the area of polymer science & engineering, industrial catalysis, bio-fuels and nanotechnology. He has so far guided 34 PhD's, 18 MTech, 8 MPhil and 25 PG students in the area of catalysis, polymer science and engineering, nanotechnology and related fields. He has successfully completed several sponsored research projects and presently have four major sponsored projects supported by various frontier funding agencies in India and abroad. His research work has been published in more than 175 articles in internationally reputed journals.

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