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Professor Doutor Pedro Rodrigues

ijup@reit.up.pt

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22630 | Development of Co-Mo catalyst on CNT-HZSM-5 for the production of sustainable jet fuel

B.F.O. Magalhães[1,2]; K.K. Ferreira[1,2]; L.S. Ribeiro[1,2]; M.F.R. Pereira[1,2]

LSRE-LCM – Laboratory of Separation and Reaction Engineering - Laboratory of Catalysis and Materials, Faculty ofEngineering, University of Porto, Porto, Portugal[1]; ALiCE – Associate Laboratory in Chemical Engineering, Faculty of Engineering, University of Porto, Porto, Portugal[2]

Background & Aim: The current global environmental concerns led the aviation industry to pursue new sustainable alternatives to fossil fuels. This work synthesized a Co-Mo supported on CNT-HZSM-5 composite catalyst to convert palmitic acid into jet fuel hydrocarbons (C_8-C_{16}) [1]. **Methods:** The composites were synthesized by ball-milling varying the milling time (30, 60, 90 min) and the frequency (5, 10 and 15 s^{-1}) with a CNT:HZSM-5 ratio of 1:1. Co (2.5 wt.%) and Mo (10.5 wt.%) were impregnated over CNT:HZSM-5. N_2 adsorption isotherms and thermogravimetric analysis characterized the composites and catalyst. The reactions were carried out in a 100 mL stainless steel Parr reactor loaded with 500 mg of palmitic acid, 100 mg of catalyst and 50 mL of n-decane. The reactions were performed at 325 °C, 20 bar of initial H_2 and 300 rpm for 3 h. Gas chromatography-mass spectrometry analyzed the results using a ZB-5MSPlus column and docosane as an internal standard. **Results:** All composites showed significant thermal stability in elevated temperatures and homogeneous chemical composition regarding the portion of CNT and zeolite. The best composite was prepared at 10 s^{-1} for 60 min, presenting a mesoporous feature from the CNT and some typical micropores from the HZSM-5. A palmitic acid conversion of 100 % and outstanding yields of 42 % of n- and iso-alkanes and 26 % aromatics were achieved after just 3 h. **Conclusions:** Co-Mo/CNT-HZSM-5 was efficient for the HDO reaction, showing moderate acidity and high selectivity.

Keywords: Jet fuel, hydrodeoxygenation, cracking, isomerization.

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