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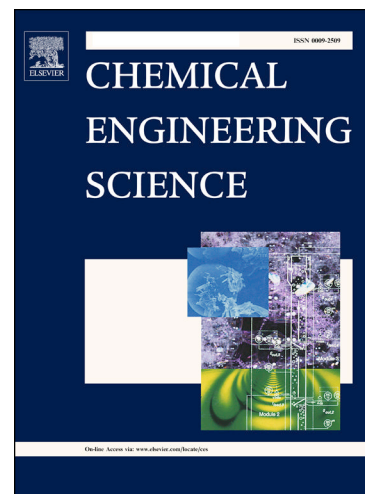
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Hydrodeoxygenation of fast pyrolysis oil with novel activated carbon-supported NiP and CoP catalysts

Cheng Guo^a, Kasanneni Tirumala Venkateswara Rao^a, Zhongshun Yuan^a, Sophia (Quan) He^b,

Sohrab Rohani^{a*}, Chunbao (Charles) Xu^{a*}

^a*Institute for Chemicals and Fuels from Alternative Resources (ICFAR), Department of Chemical & Biochemical Eng., Western University, London, ON, N6A 5B9, Canada*

^b*Department of Engineering, Faculty of Agriculture, Dalhousie University, Truro, Nova Scotia, B2N 5E3, Canada*

**Corresponding authors: Email: srohani@uwo.ca (S. Rohani); cxu6@uwo.ca (C. Xu)*

Abstract

Catalytic hydrodeoxygenation (HDO) has been considered as a promising technical route to upgrade fast pyrolysis oil to liquid transportation fuels. In this work, a series of active and inexpensive catalysts were synthesized for bio-oil HDO, i.e., activated carbon (AC)-supported nickel phosphide and cobalt phosphide catalysts, with a metal/P molar ratio varying from 5/2, 3/2, 1/1, 1/2, 1/3. For comparison, AC-support pure metal catalysts without P were also prepared. Effects of phosphorus content on HDO performance of the catalysts were investigated on a 100 mL bench-scale reactor system using a wood-derived pyrolysis oil at 300 °C and initial hydrogen pressure of 50 bar for 3 h. The results showed that the properties of the upgraded bio-oils were greatly affected by the phosphorus content in both Ni and Co catalysts. The best performance seemed to be achieved with the catalysts at a metal/P molar ratio of about 3/2. Moreover, 0.5 wt% of Ru was further added to the catalysts at a metal/P molar ratio of 3/2 and to the pure metal

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