

Condensation of furanic platform molecules to diesel precursors over silica supported sulfonic acid functionalized catalysts

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Sulfonic acid functionalized wrinkled carbon/silica spheres (WNSC-SO₃H) with primary mesopores were prepared with KCC-1 as a template and p-toluenesulfonic acid (TsOH) as a carbon precursor and -SO₃H source simultaneously. The physical and chemical properties of WS/C-SO₃H were characterized by N₂ adsorption, TEM, SEM, XPS, XRD, Raman spectrum, element analysis and acid-base titration techniques. WNSC-SO₃H shows excellent performance in production of high carbon e-fuel precursors and exhibit a superior intrinsic catalytic activity compared to other commercial solid acids such as Amberlyst-15. The enhanced catalytic activity is attributed to the higher SO₃H acid density, the larger and better communicating pores and the fibrous nature. 100% conversion and 91 % selectivity to target trimer was achieved and no distinct activity drop was observed after 5 cycles. This work was supported by the Energy Efficiency & Resources (No. 20163010092210) of the Korea Institute of Energy Technology Evaluation and Planning (KETEP) grant funded by the Korea government Ministry of Trade, Industry & Energy