

Sulfonated wrinkled carbon– silica nanocomposite: an efficient catalyst for the synthesis of higher carbon fuel precursors

Gebresillase Mahlet Nigus, 서정길<sup>1,†</sup>

명지대학교; <sup>1</sup>Myongji University

(jgseo@mju.ac.kr<sup>†</sup>)

Sulfonic acid functionalized wrinkled carbon/silica spheres (WNSC-SO<sub>3</sub>H) with primary mesopores were prepared with KCC-1 as a template and p-toluenesulfonic acid (TsOH) as a carbon precursor and -SO<sub>3</sub>H source simultaneously. The physical and chemical properties of WS/C-SO<sub>3</sub>H were characterized by N<sub>2</sub> adsorption, TEM, SEM, XPS, XRD, Raman spectrum, element analysis and acid–base titration techniques. WNSC-SO<sub>3</sub>H 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 SO<sub>3</sub>H 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