

Direct Conversion of C₆-carbohydrate to 2,5-Furandicarbaldehyde in One-pot System by a Tungstate and Oxovanadium complex functionalized catalyst

Neha Mittal[†], Teklebrehan G. Krstos, Anelyn Bendoy,
Grace Nisola, 이성풍, 정욱진

Energy and Environment Fusion Technology Center (E2FTC), Department of Energy
Science and Technology, Myongji University
(nehamittal432@gmail.com[†])

2,5-furandicarbaldehyde (2,5-FDC), is a significant precursor for syntheses of pharmaceuticals, macrocyclic ligands and polymers. It is synthesized by chemoselective-oxidation of 5-hydroxymethylfurfural (5-HMF), a dehydration-product of fructose. Commercial and large-scale synthesis of 2,5-FDC remains limited due to high price and tedious purification process of 5-HMF. A lucrative strategy is to synthesize 2,5-FDC from cheap fructose via one-pot system, involving dehydration of fructose and oxidation of intermediate 5-HMF. In current work, tungstate and oxovanadium complex-functionalized magnetic nanocatalyst was designed. It facilitated remarkable activity for fructose conversion, yielding 70% 2,5-FDC at mild reaction temperature. Separation and purification steps of 5-HMF were eliminated. This work was supported by Ministry of Science, ICT & Future Planning (No. 2015R1C1A2A01054605) and by National Research Foundation of Korea (NRF)-grant funded by Ministry of Education (No. 2009-0093816).