

Bi-functional Metal Catalyst for Chemical Conversion of Carbohydrates

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The bi-functionalized heterogeneous catalyst facilitated a remarkable activity for the one-pot conversion of C₆ sugars to dialdehyde compound. Long separation and purification steps of intermediate compounds could be eliminated. The dialdehyde compound was obtained with more than 70% conversion yield in a direct one-pot reaction at mild reaction temperature. This novel bi-functionalized metal catalyst with silica encapsulated iron oxide nanoparticles was synthesized by anchoring vanadium and tungsten metal sites on its surface. The prepared catalyst and its precursors were characterized by FT-IR, XRD, HRTEM and N₂ physisorption, and thermogravimetric analysis. After the reaction, catalyst can simply be recovered by using an external magnet. This work was supported by the National Research Foundation of Korea (NRF) grant funded by the Ministry of Science, ICT & Future Planning (No. 2012R1A2A1A01009683) and the Ministry of Education (No. 2009-0093816).