

## **Highly active cellulose-supported poly(hydroxamic acid)-Cu(II) complex for Ullmann etherification**

### **ABSTRACT**

Highly active natural pandanus-extracted cellulose-supported poly(hydroxamic acid)-Cu(II) complex 4 was synthesized. The surface of pandanus cellulose was modified through graft copolymerization using purified methyl acrylate as a monomer. Then, copolymer methyl acrylate was converted into a bidentate chelating ligand poly(hydroxamic acid) via a Loosen rearrangement in the presence of an aqueous solution of hydroxylamine. Finally, copper species were incorporated into poly-(hydroxamic acid) via the adsorption process. Cu(II) complex 4 was fully characterized by Fourier transform infrared (FTIR), field emission scanning electron microscopy (FE-SEM), energy-dispersive X-ray (EDX), transmission electron microscopy (TEM), inductively coupled plasma optical emission spectrometry (ICP-OES), thermogravimetric analysis (TGA), X-ray diffraction (XRD), and X-ray photoelectron spectroscopy (XPS) analyses. The cellulose-supported Cu(II) complex 4 was successfully applied (0.005 mol %) to the Ullmann etherification of aryl, benzyl halides, and phenacyl bromide with a number of aromatic phenols to provide the corresponding ethers with excellent yield [benzyl halide (70–99%); aryl halide (20–90%)]. Cu(II) complex 4 showed high stability and was easily recovered from the reaction mixture. It could be reused up to seven times without loss of its original catalytic activity. Therefore, Cu(II) complex 4 can be commercially utilized for the preparation of various ethers, and this synthetic technique could be a part in the synthesis of natural products and medicinal compounds.