Electronic supplementary information

Sulfonic acid-functionalized PCP(Cr) catalysts with Cr^{3+} and -SO_3H sites for 5-Ethoxymethylfurfural production from glucose

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Typical experimental procedure for the production of EMF from glucose

In a typical run, anhydrous ethanol (2 mL), glucose (20 mg), PCP(Cr)-BA or PCP(Cr)-NA (10 mg) were added to a 15 mL thick-walled glass reactor. The reactor was then immersed into a preheated oil bath with magnetic stirring, and the reaction mixture was stirred for a given reaction time at various temperatures. After reaching the target reaction time, the reaction was quenched by introducing the reactor into a cooled water bath. The sample was then diluted, filtered, and further employed for product analysis.

Determination of the products

Quantitative analysis of HMF and EMF was performed by a LC-2010AHT HPLC instrument from Shimadzu Corp., Japan, using an XDB-C18 column maintained at 30°C with an ultraviolet detector at 280 nm. Water/acetonitrile with a volume ratio of 85:15 was used as the mobile phase at a flow rate of 1.0 mL min^{-1}. The concentrations of ethyl levulinate (EL) were determined by a gas chromatograph equipped with DB-FFAP column and flame ionization detector (FID). The injection temperature was 270 °C. The temperature of the column was maintained at 90 °C for 3 min and then raised to 210 °C with a ramp rate of 10°C min^{-1}. Product yields were calculated on a molar basis.

From glucose to EMF: product yields were calculated on a molar basis as follows:

$$HMF\ yield\ (mol\%) = \frac{moles\ of\ HMF\ produced}{moles\ of\ starting\ glucose} \times 100$$

$$EMF\ yield\ (mol\%) = \frac{moles\ of\ EMF\ produced}{moles\ of\ starting\ glucose} \times 100$$

$$EL\ yield\ (mol\%) = \frac{moles\ of\ EL\ produced}{moles\ of\ starting\ glucose} \times 100$$