Mechanistic insights of the acid-catalyzed synthesis of diphenolic acid as a plastic precursor for 3D printing applications

Md. Shahin Rahaman and Noppadon Sathitsuksanoh
Department of Chemical Engineering, University of Louisville

Abstract

Diphenolic acid (DPA) can be used as a plasticizer and has a potential to replace/supplement the bisphenol A. The DPA can be synthesized from renewable plant biomass from lignin-derived phenol and cellulose-derived levulinic acid. The acid-catalyzed condensation reaction of phenol and levulinic acid for production of DPA was investigated by polyacid catalysts. Although condensation reaction is extensively studied, its mechanism is not well understood. Polyacids catalyzed the condensation reaction, forming a high DPA yield of ~80%. The resulting DPA is in the form of a mixture of *p,p*-DPA and *o,p*-DPA isomers. We will show the reaction pathway and the kinetic effects of reaction temperature on the resulting DPA isomers.

Biography of Presenter

Shahin Rahaman received his B.S. from Shahjalal University of Science and Technology, (Bangladesh) in 2012. Then he joined Hyundai Engineering Co., Ltd (Bangladesh) as a process engineer. A year in automotive industry spurred his curiosity about renewable materials for automotive parts. In 2016, he joined Chemical Engineering department at the University of Louisville. His current research focuses on the catalytic production of renewable materials from bioresources.