Ionic Liquids for the Dissolution, Pretreatment, and Analysis of Lignocellulosic Biomass

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Approximately 10 years ago, initial reports appeared in the literature that described the remarkable achievement of full dissolution of cellulose and lignocellulosic biomass in ionic liquids (ILs), a unique solvent system consisting of salts possessing organic chemical groups in their anionic and/or cationic constituents that exist in the liquid phase near room temperature. Subsequently, several research groups worldwide have utilized solubilization of biomass in ILs in pretreatment protocols, to fractionate hemicellulose, cellulose, and lignin (via dissolution in ILs followed by the addition of antisolvents for selective precipitation), and to decrease the crystallinity of cellulose, thereby enhancing saccharification. This paper will review the literature and provide results from research conducted in the authors' lab, supported by the SUN Grant funding, relating to IL pretreatment of biomass and to the use of biomass dissolution to quantify lignin via a simple spectrophotometric approach.