

Novel Catalytic Surface Design & Applications of Carbon Materials

新穎碳質觸媒表面的設計及其應用

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Novel catalytic surface design of carbonaceous materials has been demonstrated and employed as an effective catalyst for the conversion of lignocellulosic biomass. Lignocellulosic biomass feedstocks contain significant amount of carbohydrates, including cellulose and hemicellulose. Depolymerization represents the conversion of these carbohydrates into their monomeric sugar constituents. We investigate the role of weak-acid surface sites on carbonaceous catalysts for this depolymerization, based on previous bioorganic molecular models of hydrolysis-enzyme active sites. We demonstrated that carbonaceous materials strongly adsorb long-chain glucans from acid hydrolyzate likely due to carbohydrate-aromatic interaction between glucan and carbon surface, and specifically show the adsorption and hydrolysis of extracted polysaccharides derived from *Miscanthus* biomass, using these aforementioned concepts.