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Degradation of lignin in acidic imidazolium ionic liquid

Liyuan Xue[1], **Liangcong Yan**[1], **Man Jiang**[1], **Xiaoling Xu**[1], **Shengli Zhang**[1], **Jihua Gou**[2] and **Zuowan Zhou**[1]
[1]Southwest Jiaotong University, China
[2]University of Central Florida, USA

Lignin is the highest energy component of plant biomass consisting of phenol units. Eco-friendly degradation of lignin in ILs provides an important way to utilize it efficiently. In this study, 1-methyl-3-benzylimidazoliumchloride (BnMIMCl) and 1-methyl-3-benzylimidazolium trichloroacetate(BnMIMTFA) were applied for degradation liquefaction of lignin. The highest liquefaction efficiency of 75.45% was obtained under the optimized condition. This attributed to the good dissolving capability and assistance of the ILs to lignin during the degradation. GC-MS analysis showed that 60% of low molecular products were phenols. The present method is simple and efficient at liquefaction and provides a useful approach for the production of basic petrochemical materials. Lignin is used for these materials. It is the second most abundant natural organic polymer after cellulose in the world.

jiangman1021@163.com

Tungsten supported Ti/SiO2 nanoflowers: Mesoporous catalyst for biodiesel production

Mandeep Kaur and **Amjad Ali**
CT Group of Institutions, India

Present work demonstrated a convenient method for the synthesis of flower shaped tungsten supported TiO_2/SiO_2 (W/Ti/SiO_2) without using templates by sol-gel method in a single step. The prepared W/Ti/SiO_2 has been employed as heterogeneous catalyst for the transesterification of variety of feed stocks viz., fresh cotton seed, waste cotton seed and karanja oil with methanol. The surface morphology and shape of prepared catalyst was determined by field emission scanning electron microscopy (FESEM) and high resolution transmission electron microscopy (HRTEM) studies. The catalyst structure and crystallite size were determined by the by powder X-Ray Diffraction (XRD) study. The catalyst active sites were quantified by NH_3 temperature programmed desorption (TPD) study and surface area of prepared catalysts was determined by Brunauer-Emmett-Teller (BET) technique. Under optimal reaction conditions of methanol/oil molar ratio of 30:1, catalyst to oil weight fraction of 5 % and 65° C reaction temperature, a 98% fatty acid methyl esters (FAMEs) yield was obtained from the waste cotton seed oil in 4 hour. The optimized catalyst was reused successfully for transesterification reaction up to 5 cycles without any significant loss in activity. Few physicochemical properties of the prepared biodiesel sample have also been studied and compared with standard values.

mandeepthapar@gmail.com