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Microwave-assisted acid pretreatment of alkali lignin: Effect on characteristics and pyrolysis behavior

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Abstract This study performed microwave-assisted acid pretreatment on pure lignin. The effects of microwave temperature, microwave time, and hydrochloric acid concentration on characteristics and pyrolysis behavior of lignin were examined. Results of ultimate analysis revealed better properties of all pretreated samples than those of raw lignin. Fourier transform infrared spectroscopy analysis showed breakage of β-O-4 bond and aliphatic side chain, decrease in -OH groups, and formation of C=O groups in pretreatment. Microwave temperature exerted more significant influence on lignin structure. Thermal stability of treated lignin was improved and insensitive to short microwave time and acid concentration under mild

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