木粉水解残渣热解半焦结构及反应性研究 Study on Structure and CO2 Gasification Reactivity of Acid Hydrolysis Residue Char

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摘 要： 以典型的稀酸水解工艺中产生的残渣为原料，通过高温管式炉以慢速升温方式制备了木粉酸水解残渣(AHR)热解半焦。通过工业分析对比分析了AHR与其热解半焦组成的变化。利用XRD和SEM分析方法对半焦样品的晶相结构及表面形貌进行了表征，通过不同热解终温下半焦样的结构形貌变化解释其反应性的差异。在热重分析仪上通过分析半焦在CO2气氛下的失重，表征AHR热解半焦CO2气化反应性。工业分析结果表明随着热解终温的升高，半焦的炭化程度升高。XRD结果分析显示：随着热解终温的升高，AHR热解半焦的类晶相结构的有序化程度增高；SEM结果表明：木粉的纤维结构经酸水解后发生了变化，AHR热解半焦形态与木粉半焦有着明显区别；随着热解终温的升高，半焦样的解构程度增加。对气化反应活性的研究表明：随着热解终温的升高，半焦样的反应活性降低。 A typical acid hydrolysis residue (AHR) was adopted as material to make char in a tube reactor with low heating rate. Proximate analysis was carried out to show component differences between AHR and the char. The crystal structure and morphology of char samples were characterized by X-ray diffractometry (XRD) and scanning electron microscopy (SEM), and were analyzed to explain changes of CO2 gasification reactivity. The CO2 gasification reactivity of acid hydrolysis residue was studied in the view of the rate of weight loss by a thermal gravimetric analyzer. The results showed carbonization increased as pyrolysis temperature rised, increase of final pyrolysis temperature enhanced the degree of crystal-like ordering, and the degree of char deconstruction increased with final pyrolysis temperature increasing. The CO2 gasification reactivity showed a decrease tendency when final pyrolysis temperature increases.

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