

硫酸盐黑液热解特性分析 Experiment of Kraft Black Liquor Pyrolysis Characteristics

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摘要: 采用可视化单液滴反应器观察硫酸黑液在400~800℃范围内的热解膨胀行为, 判断较低和较高温度的不同膨胀特性。测定了3种硫酸盐黑液在450~850℃范围内热解永久性气体中H₂、CO、CO₂和CH₄相对含量, 考察热解气体中大量H₂的主要来源。热解导致的总硫释放量通过对热解焦的分析得到, 并用碘量法确定了气相中H₂S含量。结果表明: 高于500℃时, 黑液膨胀至最大体积后将开始收缩, 而低于此温度则膨胀至最大体积后保持不变; 黑液热解永久性气体中H₂的含量较高, 在惰性载气连续吹扫的情况下, 水蒸气并未参与热解焦气化反应, 几乎全部的H₂均来自黑液有机物的分解; 低于650℃时总硫与H₂S释放量随温度升高而增加, 而高于此温度时释放量反而逐渐减少。 Black liquor pyrolysis/gasification is a promising alternative for conventional combustion method. The swelling of kraft black liquor was tested at 400~800℃ under nitrogen atmosphere with a visualized single droplet reactor. The main permanent pyrolysis gas components of three kraft black liquors were investigated at temperatures up to 850℃. The measurements of hydrogen sulfide release during pyrolysis were realized by iodometry, the total sulfur release was evaluated through char analysis. At the runs which temperatures higher than 500℃, the droplet volumes began decrease after the droplets swelled to the maximums. Water contents of the black liquors had no significant effects on the hydrogen yields under the reaction atmosphere where nitrogen was used as carrier gas, so nearly all the hydrogen was generated from organic components at the considered experimental conditions. The hydrogen sulfide release has similar trend to total sulfur release, i.e., the release contents reached to the maximums at about 650℃, and below or above this temperature range they decreased.

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