

## 玉米秸秆等离子体热裂解液化实验 Experiment on Plasma Pyrolysis of Corn Stalk for Liquid Fuel

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关键词: 生物质 玉米秸秆 热裂解 等离子体 生物油

摘要: 采用山东理工大学自制小型流化床设备, 利用玉米秸秆为原料进行了热裂解过程及生物油特性的实验研究。结果表明采用等离子体加热, 整个反应器的预热时间大约为1.5h, 且反应过程中流化床内温度稳定, 有利于生物质快速热裂解反应的进行。对反应产物——生物油热值特性作了分析, 得出未经任何处理的生物原油的热值为18066.62kJ/kg, 脱炭后热值低于脱炭前的生物油热值, 其差值为3446.71kJ/kg, 说明生物油中含有一定的固体炭。将脱炭后的生物油进行脱水处理后, 测得生物油热值高出脱炭后生物油热值一倍左右。另外, 玉米秸秆进行稀硝酸处理后, 虽然玉米秸秆的热值降低, 但裂解后生物油的热值有所提高, 其热值差为 913.74kJ/kg。采用GC—MS分析得知, 生物油是一种复杂的含氧有机化合物和水组成的混合物, 也是导致其不稳定的主要原因。This experimental study on plasma pyrolysis of corn stalk and the feature of bio-oil was carried out in a self manufactured small fluidized bed reactor with corn stalk. Results showed that the temperature in the fluidized bed was steady under the condition of adopting the plasma body to heat the reactor, and the preheat time is 1.5h. The heating value of pyrolysis liquid—bio-oil was analyzed. The heating value of crude bio-oil obtained is 18066.62kJ/kg. Heating value after taking off carbons is lower by 3446.71kJ/kg than that of before taking off carbons. Thus, there is some certain solid charcoal in the bio-oil. The bio-oil after taking off the carbon was get rid of the water, which heating value is one time higher than that of the bio-oil after only taking off the carbon, with the difference of 14345.95kJ/kg.

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