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反应与分离

Fast Pyrolysis of Biomass in a Spout-fluidized Bed Reactor Analysis of Composition and Combustion Characteristics of Liquid Product from Biomass

陈明强,王君,王新运,张学才,张素平,任铮伟,颜涌捷

安徽理工大学化学工程系

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摘要 In order to gain insight into the fast pyrolysis mechanism of biomass and the relationship between bio-oil composition and pyrolysis reaction conditions, to assess the possibility for the raw bio-oil to be used as fuel, and to evaluate the concept of spout-fluidized bed reactor as the reactor for fast pyrolysis of biomass to prepare fuel oil, the composition and combustion characteristics of bio-oil prepared in a spout-fluidized bed reactor with a designed maximum capacity 5 kg/h of sawdust as feeding material, were investigated by GC-MS and thermogravimetry. 14 aromatic series chemicals were identified. The thermogravimetric analysis indicated that the bio-oil was liable to combustion, the combustion temperature increased with the heating rate, and only minute ash was generated when it burned. The kinetics of the combustion reaction was studied and the kinetic parameters were calculated by both Ozawa-Flynn-Wall and Popsecu methods. The results agree well with each other. The most probable combustion mechanism functions determined by Popescu method are f(a)=k(1-a)2 (400~406℃), f(a)=1/2k(1-a)3 (406~416℃) and f(a)=2k(1-a)3/2 (416~430℃) respectively.

关键词 biomass,pyrolysis,spout-fluidized bed,liquid product,combustion characteristics

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通讯作者:

作者个人主页: 陈明强;王君;王新运;张学才;张素平;任铮伟;颜涌捷