

论文

串行流化床生物质气化制取合成气试验研究

吴家桦, 沈来宏, 肖军, 王雷, 郝建刚

东南大学热能工程研究所

摘要:

串行流化床气化是一种崭新的气化技术, 可将气化和燃烧过程分隔开, 气化反应器和燃烧反应器之间依靠惰性固体载热体进行热量传递。以水蒸气为气化介质, 在小型串行流化床试验装置上进行生物质气化制取合成气的试验研究, 探讨气化反应器温度T、水蒸气与生物质比率S/B对气化结果的影响。试验结果表明, 燃烧反应器内燃烧烟气不会串混至气化反应器, 该气化技术能够稳定连续地从气化反应器获得不含N2的高品质合成气。随着气化反应器温度的提高, 合成气中j(H2)/j(CO)减小, 合成气产率增加, 热值降低,总碳转换率先升高而后保持不变。随着S/B的增大, 合成气产率和总碳转换率均先升高而后降低, S/B的最佳值为1.4。在试验阶段获得的最高合成气产率为1.87 m3/kg,合成气热值为13.20 MJ/m3,总碳转化率为91%。

关键词: 热能工程 串行流化床 生物质气化 合成气

Experimental Study on Syngas Production From Biomass Gasification in

WU Jia-hua, SHEN Lai-hong, XIAO Jun, WANG Lei, HAO Jian-gang

Thermal Engineering Research Institute, Southeast University

Abstract:

High quality syngas production in interconnected fluidized beds of biomass gasification was investigated experimentally. The gasification-required heat was achieved by means of the external recirculation of inert particles in interconnected fluidized beds. The effects of gasifier temperature and steam/biomass ratio on syngas composition, syngas yield, syngas heating value, and total carbon conversion were discussed. The results indicate that the flue gas of combustion and the syngas of gasification are never mixed, and high quality syngas which is free of N2 dilution can be obtained from the gasifier. With the increase of gasifier temperature, j(H2)/j(CO) decreases, syngas yield increases, and heating value of syngas decreases, total carbon conversion increases remarkably with the gasifier temperature at the lower temperature range 720 to 820 °C, and reaches its maximum of 91% at the gasifier temperature of 820 °C, and then keeps nearly constant. There is an optimal value of steam/biomass ratio corresponding to maximal syngas yield and total carbon conversion. For the gasifier temperature of 820 °C, syngas yield and total carbon conversion reach their maximum at the steam/biomass ratio of 1.4, and then decrease with the further increase of steam/biomass ratio. The maximum syngas yield and heating value can be attained 1.87 m3/kg and 13.20 MJ/m3, respectively.

Keywords: thermal power engineering interconnected fluidized beds biomass gasification syngas

收稿日期 2008-09-03 修回日期 2008-10-29 网络版发布日期 2009-04-20

DOI:

基金项目:

国家自然科学基金项目(20590367, 90610016); 国家重点基础研究发展规划基金项目(2006CB20030201, 2007CB210208); 国家高技术研究发展计划项目(863计划)(2006AA05Z318)。

通讯作者: 吴家桦

作者简介:

参考文献:

本刊中的类似文章

文章评论 (请注意:本站实行文责自负, 请不要发表与学术无关的内容!评论内容不代表本站观点.)

扩展功能

本文信息

- ▶ Supporting info
- ▶ PDF(OKB)
- ▶ [HTML全文]
- ▶ 参考文献

服务与反馈

- ▶ 把本文推荐给朋友
- ▶ 加入我的书架
- ▶ 加入引用管理器
- ▶ 引用本文
- ▶ Email Alert
- ▶ 文章反馈
- ▶ 浏览反馈信息

本文关键词相关文章

- ▶ 热能工程
- ▶ 串行流化床
- ▶ 生物质气化
- ▶ 合成气

本文作者相关文章

- ▶ 吴家桦
- ▶ 沈来宏
- ▶ 肖军
- ▶ 王雷
- ▶ 郝建刚

PubMed

- ▶ Article by Wu,J.H
- ▶ Article by Chen,L.H
- ▶ Article by Xiao,j
- ▶ Article by Yu,l
- ▶ Article by Hao,J.G

反馈人	<input type="text"/>	邮箱地址	<input type="text"/>
反馈标题	<input type="text"/>	验证码	<input type="text" value="4828"/>