

论文

基于BP神经网络的生物质固定床热解气化过程模拟

闵凡飞, 张明旭

安徽理工大学 材料科学与工程学院, 安徽 淮南 232001

摘要:

为研究生物质的热解气化规律, 基于BP神经网络原理, 利用Matlab神经网络工具箱, 以试验得到的两种生物质54组试验数据作为样本, 建立了以停留时间、水分、温度、催化剂种类和催化剂用量为输入变量, 气、液、固产物产率和不同种类气体组成为输出变量的生物质固定床热解气化过程模型。模型输出的7个变量的预测结果与试验数据吻合较好, 证明该模型对生物质热解气化过程模拟的可行性和有效性。

关键词: BP神经网络; 生物质; 固定床; 热解气化; 过程模拟

BP neural network simulation of biomass pyrolysis gasification in a fixed bed reactor

Abstract:

A BP neural network was built to simulate the pyrolysis gasification process of biomass in a fixed bed reactor by using Matlab neural network toolbox.Five input variables, i.e.residence time, initial moisture of biomass, pyrolysis gasification temperature, the kinds of catalyst and the catalyst weight/biomass weight ratios, and seven output variables, i.e.gas yield, liquid yield, solid yield and four kinds of gas component were selected.54 groups experimental data were taken as training and checking samples.The results show that model predicted results of seven output variables are in sound agreement with the experimental data.Thereby the neural network model is considered to properly reflect the real pyrolysis gasification process of a biomass.The feasibility and effectiveness of the BP based model are also presented.

Keywords: BP neural network; biomass; fixed bed; pyrolysis gasification; process simulation

收稿日期 2011-08-05 修回日期 2012-04-28 网络版发布日期 2012-09-03

DOI:

基金项目:

国家自然科学基金资助项目(51046003); 教育部留学回国人员科研启动基金资助项目

通讯作者: 闵凡飞

作者简介: 闵凡飞(1969—), 男, 安徽濉溪人, 教授, 博士

作者Email: ffmin@aust.edu.cn

参考文献:

本刊中的类似文章

Copyright by 煤炭学报

扩展功能

本文信息

- ▶ Supporting info
- ▶ PDF(1187KB)
- ▶ [HTML全文]
- ▶ 参考文献PDF
- ▶ 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

- ▶ BP神经网络; 生物质; 固定床; 热解气化; 过程模拟

本文作者相关文章

- ▶ 闵凡飞
- ▶ 张明旭

PubMed

- ▶ Article by Min,F.F
- ▶ Article by Zhang,M.X