燃料化学学报
JOURNAL OF FUEL CHEMISTRY AND TECHNOLOGY
ISSN 0253-2409
CN 14-1140/TQ

燃料化学学报 » 2013, Vol. 41 » Issue (12): 1409-1414　DOI:

低温加压热解脱氧对胜利褐煤亲水性的影响

黄鑫, 张书, 林雄超, 王永刚, 徐敏

中国矿业大学 化学与环境工程学院, 北京 100083

Deoxygenation effect on hydrophilicity changes of Shengli lignite during pressurized pyrolysis at low temperature

HUANG Xin, ZHANG Shu, LIN Xiong-chao, WANG Yong-gang, XU Min

School of Chemical and Environmental Engineering, China University of Mining and Technology, Beijing 100083, China

- 摘要
- 参考文献
- 相关文章
- 点击分布统计
- 下载分布统计

全文: PDF (899 KB)　HTML (1 KB)　输出: BibTeX | EndNote (RIS)　背景资料

摘要 在固定床反应器中考察了低温（200~350 ℃）、加压（0.25~8.00 MPa）热解条件下胜利褐煤主要含氧官能团的变化规律，并进一步分析了褐煤中含氧官能团的脱除对其吸水能力的影响。结果表明，温度升高对胜利褐煤中羧基和酚羟基的脱除非常有效，压力变化对羧基脱除影响极小，而在3.00~4.00 MPa时对酚羟基脱除效果最佳；同时羧基对煤样的表面极性和亲水性具有决定性作用，当羧基含量不变时，固体比表面积对煤样的吸水性影响相对较明显。

关键词： 固定床　热解　含氧官能团　最高内在水分

Abstract： The effect of temperature (200~350 ℃) and pressure (0.25~8.00 MPa) on the elimination of main oxygen-containing functional groups of Shengli lignite was examined during pyrolysis in a fixed-bed reactor. Effects of the reduction of oxygen-containing functional groups on the moisture holding capacity (MHC) of coal samples were also investigated. The results showed that temperature was the key factor on the removal of carboxyl and phenolic hydroxyl from the lignite. The variation of pressure had few effects on the removal of carboxyl in coal; in contrast, phenolic hydroxyl was reduced to a minimum point at the pressure between 3.00 to 4.00 MPa. The carboxyl content in the lignite played a dominant role on the surface polarity and moisture holding capacity. The influence of specific surface area on the MHC became distinct when the carboxyl content in coal samples kept constant.

Key words： fixed-bed reactor　pyrolysis　oxygen-containing functional groups　moisture holding capacity

收稿日期: 2013-05-14;

基金资助:

国家自然科学基金（21076222）。

通讯作者: 王永刚（1960- ），男，教授，主要研究方向为煤化学及煤的转化利用，Tel：010-62339882，E-mail：wyg1960@126.com；张书，Tel：010-62331048，E-mail：zhangshuwo@hotmail.com。　E-mail: wyg1960@126.com；zhangshuwo@hotmail.com

引用本文:

黄鑫,张书,林雄超等. 低温加压热解脱氧对胜利褐煤亲水性的影响[J]. 燃料化学学报, 2013, 41(12): 1409-1414.

HUANG Xin,ZHANG Shu,LIN Xiong-chao et al. Deoxygenation effect on hydrophilicity changes of Shengli lignite during pressurized pyrolysis at low temperature[J]. J Fuel Chem Technol, 2013, 41(12): 1409-1414.

链接本文:

http://rlhxxb.sxicc.ac.cn/CN/　或　http://rlhxxb.sxicc.ac.cn/CN/Y2013/V41/I12/1409

服务
- 把本文推荐给朋友
- 加入我的书架
- 加入引用管理器
- E-mail Alert
- RSS

作者相关文章
- 黄鑫
- 张书
- 林雄超
- 王永刚
- 徐敏

[1] 韦小梅, 周敏, 刘恭欣, 杜宇. 低煤化度煤低温热改质的研究进展[J]. 能源技术与管理, 2011, (1): 119-124. (WEI Xiao-mei, ZHOU Min, LIU Gong-xin,

DU Yu. Research progress of low temperature pyrolysis upgrading for low rank coal[J]. Energy Technology and Management, 2011, (1): 119-124.)

[2] 尉迟唯, 李保庆, 李文, 陈皓侃. 煤质因素对水煤浆性质的影响[J]. 燃料化学学报, 2007, 35(2): 146-154. (YUCHI wei, LI Bao-qing, LI Wen, CHEN Hao-kan. Analysis of coal characteristics on the properties of coal water slurry preparation with different coal ranks[J]. Journal of Fuel Chemistry and Technology, 2007, 35(2): 146-154.)

[3] 王彬. 浅析褐煤提质技术现状[J]. 煤质技术, 2011, (4): 9-13. (WANG Bin. Discussion on the present situation of lignite upgrading technology [J]. Coal Quality Technology, 2011, (4): 9-13.)

[4] 张殿奎. 我国褐煤综合利用的发展现状及展望[J]. 神华科技, 2010, 8(1): 51-56. (ZHANG Dian-kui. Development situation and outlook for comprehensive utilization of brown coal in China[J]. Shenhua Science and Technology, 2010, 8(1): 51-56.)

[5] 朱书全. 褐煤提质技术开发现状及分析[J]. 洁净煤技术, 2011, 17(1): 1-4. (ZHU Shu-quan. Development status and analysis of lignite quality improvement technology[J]. Clean Coal Technology, 2011, 17(1): 1-4.)

[6] 邵俊杰. 褐煤提质技术现状及我国褐煤提质技术发展趋势初探[J]. 神华科技, 2009, 7(2): 17-22. (SHAO Jun-jie. The development status of lignite quality improvement technology and development trend of China's lignite quality improvement technology[J]. Shenhua Science and Technology, 2009, 7(2): 17-22.)

[7] 马尊美. 煤的最高内在水分测定方法及应用[J]. 煤炭科学技术, 1987, (6): 23-26. (MA Zun-mei. Determination method and application for moisture holding capacity of coal[J]. Coal Science and Technology, 1987, (6): 23-26.)

[8] 李敏. 煤表面含氧官能团的研究[D]. 太原: 太原理工大学, 2004. (LI Min. Research on oxygen-containing functional groups on coal surface[D]. Taiyuan: Taiyuan University of Technology, 2004.)

[9] YU Y J, LIU J Z, WANG R K, ZHOU J H, CEN K F. Effect of hydrothermal dewatering on the slurry ability of brown coals[J]. Energy Conver Manage, 2012, 57: 8-12.

[10] 周剑林, 王永刚, 黄鑫, 张书, 林雄超. 低阶煤中含氧官能团分布的研究[J]. 燃料化学学报, 2013, 41(2): 134-138. (ZHOU Jian-lin, WANG Yong-gang, HUANG Xin, ZHANG Shu, LIN Xiong-chao. Determination of O-containing functional groups distribution in low-rank coals by chemical titration[J]. Journal of Fuel Chemistry and Technology, 2013, 41(2): 134-138.)

[11] 王娜, 朱书全, 杨玉立, 吴鹏, 张恒. 含氧官能团对褐煤热态提质型煤防水性的影响[J]. 煤炭科学技术, 2010, 38(3): 125-128. (WANG Na, ZHU Shu-quan, YANG Yu-li, WU Peng, ZHANG Heng. Oxygen-containing function groups affected to waterproof of thermal upgraded lignite briquettes[J]. Coal Science and Technology, 2010, 38(3): 125-128.)

[12] ALLARDIC D J, CLEMOW L M, JACKSON W R. Determination of the acid distribution and total acidity of low-rank coals and coal-derived materials by an improved barium exchange technique[J]. Fuel, 2003, 82(1): 35-40.

[13] 戴中蜀, 郑昀晖, 马立红. 低煤化度煤低温热解脱氧后结构的变化[J]. 燃料化学学报, 1999, 27(3): 256-261. (DAI Zhong-shu, ZHENG Yun-hui, MA Li-hong. Structural change of low rank coal by deoxygen under pyrolysis at low temperature[J]. Journal of Fuel Chemistry and Technology, 1999, 27(3): 256-261.)

[14] 李春柱. 维多利亚褐煤科学进展[M]. 北京: 化学工业出版社, 2007: 116-117. (LI Chun-zhu. Advances in the science of Victorian brown coal[M]. Beijing: Chemical Industry Press, 2007: 116-117.)

[15] 童兰英. 白音华褐煤热解以及酚类酚类化合物分布的研究[D]. 大连: 大连理工大学, 2008. (TONG Lan-ying. Distribution of phenols and pyrolysis of Baiyinhua lignite[D]. Dalian: Dalian University of Technology, 2008.)

[16] 王宝俊, 李敏, 赵青艳, 秦育红, 谢克昌. 煤的表面电位与表面官能团间的关系[J]. 化工学报, 2004, 55(8): 1329-1334. (WANG Bao-jun, LI Min, ZHAO Qing-yan, QIN Yu-hong, XIE Ke-chang. Relationship between surface potential and functional groups of coals[J]. Journal of Chemical Industry and Engineering, 2004, 55(8): 1329-1334.)

[17] 杨林江, 欧阳云丽, 柯文丽, 游艺, 李庆会. 煤岩润湿性影响因素研究[J]. 煤, 2012, 21(8): 4-5. (YANG Lin-jiang, OUYANG Yun-li, KE Wen-li, YOU Yi, LI Qing-hui. Research on the impact factors of coal wettability[J]. Coal, 2012, 21(8): 4-5.)

[18] 谢克昌. 煤的结构与反应性[M]. 北京: 科学出版社, 2002: 274-275. (XIE Ke-chang. Coal structure and its reactivity[M]. Beijing: Science Press, 2002: 274-275.)

[19] 王贤华, 徐健, 杨海平, 陈汉平. 加压热解对煤焦理化结构特性的影响[J]. 华中科技大学学报, 2011, 39(7): 123-127. (WANG Xian-hua, Xu Jian, YANG Hai-ping, CHEN Han-ping. Influence of pyrolysis pressure on coal char physic-chemical property[J]. Journal of Huazhong University of Science and Technology, 2011, 39(7): 123-127.)

[1] 钟梅, 马凤云. 不同气氛下煤连续热解产物的分配规律及产品品质分析[J]. 燃料化学学报, 2013, 41(12): 1427-1436.

[2] 王永刚, 周剑林, 陈艳巨, 胡秀秀, 张书, 林雄超. ^{13}C固体核磁共振分析煤中含氧官能团的研究[J]. 燃料化学学报, 2013, 41(12): 1422-1426.

[3] 张俊姣, 廖航涛, 陆强, 张阳, 董长青. 果糖低温快速热解制备糠醛的机理研究[J]. 燃料化学学报, 2013, 41(11): 1303-1309.

[4] 孔娇, 程柱, 董洁, 焦海丽, 李凡. 平朔煤热解过程中PAHs的释放特性[J]. 燃料化学学报, 2013, 41(11): 1281-1286.

[5] 李梅, 杨俊和, 张启锋, 常海洲, 孙慧. 用XPS研究新西兰高硫煤热解过程中氮、硫官能团的转变规律[J]. 燃料化学学报, 2013, 41(11): 1287-1293.

[6] 张书, 白艳萍, 米亮, 郑盼盼, 陈绪军, 许德平, 王永刚. 升温速率对胜利褐煤热解过程中N迁移转化的影响[J]. 燃料化学学报, 2013, 41(10): 1153-1159.

[7] 张晋玲, 王美君, 陈望舒, 付春慧, 任秀荣, 常丽萍. 逐级酸处理对锡盟褐煤的结构及热解特性的影响：气相产物的生成[J]. 燃料化学学报, 2013, 41 (10): 1160-1165.

[8] 陆强, 廖航涛, 张阳, 张俊姣, 董长青. 果糖低温快速热解制备5-羟甲基糠醛的机理研究[J]. 燃料化学学报, 2013, 41(09): 1070-1076.

[9] 朱锡锋, 朱昌朋. 生物质热解液化与美拉德反应[J]. 燃料化学学报, 2013, 41(08): 911-916.
[10] 邓靖, 李文英, 李晓红, 喻长连, 冯杰, 郭小汾. 橄榄石基固体热载体影响褐煤热解产物分布的分析[J]. 燃料化学学报, 2013, 41(08): 937-942.
[11] 武宏香, 李海滨, 冯宜鹏, 王小波, 赵增立, 何方. 钾元素对生物质主要组分热解特性的影响[J]. 燃料化学学报, 2013, 41(08): 950-957.
[12] 黄金保, 刘朝, 任丽蓉, 童红, 李伟民, 伍丹. 木质素模化物紫丁香酚热解机理的量子化学研究[J]. 燃料化学学报, 2013, 41(06): 657-666.
[13] 高松平, 赵建涛, 王志青, 王建飞, 房倚天, 黄戒介. CO对褐煤快速热解行为的影响[J]. 燃料化学学报, 2013, 41(05): 550-557.
[14] 吴磊, 周志杰, 王兴军, 于广锁, 王辅臣. 神府烟煤水煤浆快速热解焦结构演化及其反应性的研究[J]. 燃料化学学报, 2013, 41(04): 422-429.
[15] 王立, 陈雪莉, 赵英杰, 李帅丹, 王辅臣. 稻草与煤固定床共热解特性的研究[J]. 燃料化学学报, 2013, 41(04): 436-442.