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工程热物理

热解温度对神府煤热解与气化特性的影响

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摘要
采用大容量加压热重分析仪研究了不同热解温度(500, 650, 800 和1 000 ℃)与压力(常压、3 MPa)下神府煤的热解特性，同时采用傅里叶红外光谱仪、比表面积分析仪等分析仪器对所得煤焦的物化特性进行了详细分析。发现高温有利于挥发分的析出，使得煤焦产量快速降低；同时煤焦内C元素的含量快速增加而H含量逐渐减少，同时煤焦内有机官能团的红外吸收也明显减少；煤焦的孔隙表面积和孔容随热解终温的升高先增大后减小，在800 ℃(常压)和650 ℃ (3MPa)取得最小值。热解温度和压力对煤焦的气化活性也有显著的影响。采用常压热重分析仪在1000 ℃下分析了煤焦的CO2等温气化特性。常压热解焦的CO2等温气化活性随温度升高而降低，而加压热解得到的焦有不同的趋势，说明压力和温度对煤粉热解和气化的影响有一定交互作用。

关键词 热解终温 压力 煤焦 物化结构 气化活性

分类号 TK 16

Influence of Temperature on Coal Pyrolysis and Char Gasification

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Abstract
The pyrolysis of Shenfu coals was performed in pressurized thermogravimetric analyzer (PTGA) at variant temperatures (500, 650, 800 and 1000 ℃) and different pressure (ambient and 3 MPa). Simultaneously, the chemical and pore structure of the resultant solid char was determined using Fourier transform infrared (FTIR) spectroscopy, accelerated surface area porosity (ASAP 2020), etc. analysis instruments. It was observed that with temperature increasing, the gas product from coal pyrolysis was enhanced greatly while charcoal residue was decreased. Carbon content increased while H content decreased greatly. IR absorbance of organic functional groups of charcoal particles decreased greatly with final temperature increasing. The surface area decreased with temperature increasing as temperature lower than 800 ℃ (at ambient pressure) and 650 ℃ at 3 MPa. However, after that it increased greatly. The gasification of the resultant solid char was carried out using ambient thermal balance at 1 000 ℃, with CO2 as gasify agent. The gasification reactivity of solid charcoal residues observed at ambient pressure decreased greatly with temperature increasing, while that of pressurized chars showed different trend. There exists some interaction between pyrolysis temperature and pressure.

Key words final temperature pressure charcoa physico-chemical structure pneumatic conveying

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