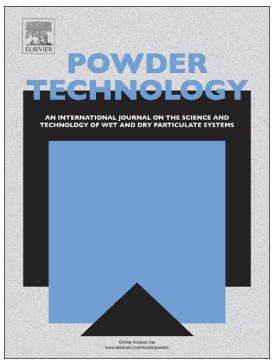

Effects of low-temperature air plasma pretreatment on the surface properties of low-rank coal

Dapeng Wang, Meng Xu, Jingfeng He, Chao Guo

PII: S0032-5910(18)30746-0
DOI: doi:10.1016/j.powtec.2018.09.019
Reference: PTEC 13693

To appear in: *Powder Technology*

Received date: 9 April 2018
Revised date: 27 August 2018
Accepted date: 6 September 2018

Please cite this article as: Dapeng Wang, Meng Xu, Jingfeng He, Chao Guo , Effects of low-temperature air plasma pretreatment on the surface properties of low-rank coal. Ptec (2018), doi:10.1016/j.powtec.2018.09.019

Effects of low-temperature air plasma pretreatment on the surface properties of low-rank coal

Dapeng Wang [a, b], Meng Xu [b], Jingfeng He [a, b,*], Chao Guo [b]

[*] Corresponding author: Jingfeng He

Tel. +86(0)13641547247; Email address: jfhe@cumt.edu.cn

[a] *Key Laboratory of Coal Processing and Efficient Utilization of Ministry of Education, China University of Mining and Technology, Xuzhou 221116, China*

[b] *School of Chemical Engineering and Technology, China University of Mining and Technology, Xuzhou 221116, China*

Abstract:

The surface topography, chemical composition, and pore size distributions of low-rank coal treated with RF (Radio Frequency) plasmas using various periods were investigated by the means of SEM-EDS, XPS, and BET to realize the potential of plasma technology for the surface modification of low-rank coal in the selective flotation. Moreover, the wettability and floatability of coal sample were studied after plasma pretreatment. The results showed that a large sum of stripes and polygonal pits were generated, which significantly increased surface roughness, gradually decreased the contents of C–C and C–H, and increased COO– content through the plasma pretreatment. The contact angle of coal sample decreased from 75° to 0° with the increase of treatment time. The flotation tests indicated that the floatability of the low-rank coal sample sharply decreased through the plasma pretreatment. The remarkable differences in the contact angle and the flotation yields between the untreated coal and the treated coal under various treatment periods suggested that the reverse flotation performance