

论文

高硫炼焦煤介电性质研究

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摘要:

为确定典型高硫炼焦煤种在不同条件下的电磁特性, 获知其波能吸收频率范围, 为微波脱硫条件选择提供依据, 利用传输反射法在0.2~18.0 GHz频率范围内扫频测定山西高硫炼焦煤介电常数, 考察密度、粒度、矿物质等影响因素。结果表明, 原煤介电常数实部  $\epsilon'$  随频率的增大略有下降, 虚部  $\epsilon''$  随频率的增大先减小后增大, 在 15.619 GHz达到峰值; 损耗角正切 $\tan \sigma$  在15.664 GHz处有峰值; 煤中高岭石含量增加,  $\epsilon'$ ,  $\epsilon''$  均增大, 方解石对介电性质基本没有影响, 石英介于二者之间; 在0.2~10.0 GHz,  $\epsilon'$  随粒度的增大而增大,  $\epsilon''$  随粒度的增大而降低。密度大于1.8 g/cm<sup>3</sup>的煤样,  $\epsilon'$ ,  $\epsilon''$  明显高于其他密度级煤样, 灰分高的煤样介电常数高于灰分低的煤样。

关键词: 微波; 高硫炼焦煤; 介电常数

Study on the dielectric properties of coking coal with high sulfur content

Abstract:

In order to determine the electromagnetic characteristics of high sulfur coking coal under different conditions, to learning the wave absorbing frequency range and provide a theoretical base for the selection of coal desulfurization conditions by microwave radiation, the reflection transmission method was used to measure the permittivity of coking coal with high sulphur rate in Shanxi by scanning in the frequency range between 0.2-18.0 GHz. The effects of separation density, grain size and mineral content were investigated. The results show that the real part  $\epsilon'$  of the coal's permittivity decreases slightly with the increase of the frequency, and  $\epsilon''$  decreases first then increases and achieve maximum value on 15.619 GHz. Peak of  $\tan \sigma$  appears on 15.664 GHz. When the kaolinite content in coal increases,  $\epsilon'$  and  $\epsilon''$  increase accordingly. The calcite basically has no influence on dielectric properties, and quartz is between these two. In the range of 0.2-10.0 GHz,  $\epsilon'$  becomes larger with the grain size increasing, and  $\epsilon''$  becomes smaller. For the coal sample with density above 1.8 g/cm<sup>3</sup>,  $\epsilon'$  and  $\epsilon''$  are clearly higher than coal sample with other density level. In addition, the dielectric constant of coal sample with high ash content is higher than coal sample with low ash content.

Keywords: microwave; high sulphur coking coal; dielectric constant

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