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应用红外光谱研究脱灰对伊敏褐煤结构的影响

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Effect of demineralization on lignite structure from Yinmin coalfield by FT-IR investigation

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- 摘要
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摘要 对伊敏褐煤的原煤和脱灰煤进行了红外光谱分析，并通过分段分峰拟合分析了脱灰前后伊敏煤结构的变化。结果表明，脱灰处理对煤中有机结构会产生一定影响。对脂氢和羟基氢键有机结构影响较小，脱灰后，脂氢结构中CH_2不对称伸缩振动没有变化，CH伸缩振动明显减少，而CH_2对称伸缩振动和CH_3不对称伸缩振动略有增加；羟基氢键结构中羟基N羟基、自缔合羟基氢键以及羟基π氢键的强度有所降低，而环氢键和羟基醚氢键的吸收强度有所增加；对芳香结构和含氧官能团的影响较大，芳香结构由原煤中的苯环三取代占主导地位转变为脱灰煤中的苯环三和四取代；含氧官能团中烷基醚和脂肪羧酸脱灰后吸收峰的强度明显减弱，这是由于水解反应导致的，而酚羟基和羧酸脱灰后吸收强度明显增强。

关键词： 原煤　脱灰煤　红外光谱谱图　煤结构

Abstract： The raw coal and demineralized coal obtained from Yimin lignite were studied by Fourier transform infrared spectroscopy (FT-IR) with curve-fitting analysis to obtain the structure change information after demineralization. The results show that demineralization has little effect on aliphatic hydrogen and hydroxyl. The absorption intensity of CH_2 asymmetric stretching vibration changed little, that of CH stretching vibration decreases, and that of CH_2 symmetric stretching vibration and CH_3 asymmetric stretching vibration increases. The absorption intensity of OH-N, OH-OH and OH-π hydrogen bonds decreases and that of ring hydroxyl and OH-O intensity increases. Demineralization has great effect on aromatic structures and oxygen-containing groups. Aromatic structures change from three hydrogens per ring dominating to three and four hydrogens per ring dominates. The absorption intensity of alkyl ether and aliphatic carboxylic acids decreases significantly after demineralization, which may be caused by hydrolysis reaction. The absorption intensity of phenolic hydroxyl and carboxylic acids increases greatly after demineralization.

Key words： raw coal　demineralized coal　FT-IR　coal structure

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