

能源和环境工程

低阶煤高温高压水热处理改性及其成浆特性

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摘要 褐煤、亚烟煤等低阶煤内水、氧含量大, 直接制备浆体燃料, 成浆浓度低、粘度大、流动性差。通过高温高压对低阶煤进行水热处理(热水反应), 可以在较短时间内提升其煤阶和热值, 同时改变其理化特征, 进而较大程度提高其成浆浓度。结果表明, 热水反应后, 小龙潭褐煤最大成浆浓度可以由44.6%(原煤)提高到64.55%; 印尼MIP亚烟煤最大成浆浓度则由39.71%(原煤)提高到64.61%。不同反应终温对于热水反应产物的成浆性能改善程度不同, 从含氧基团化学分析以及煤水界面接触角两个方面进行了机理探讨。

关键词

[低阶煤](#) [水煤浆](#) [水热处理](#) [含氧基团](#) [接触角](#)

分类号

Hot water treatment of low rank coal in high temperature and high pressure reactor and its slurry ability

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Abstract

The coal water slurry (CWS) prepared from low rank coals (LRC), such as lignite or subbituminous coals always has a higher viscosity and poor fluidity while the solid concentration is smaller than high rank coal water slurry. The reason is there are larger inherent moisture and oxygen composition in LRC. Under high temperature and high pressure conditions, LRC was upgraded in hot water in a short time period of an hour. The heating value of LRC was also increased in such a process, and the physical and chemical characteristics of LRC changed meanwhile to improve its slurry ability which meant a higher solid concentration with a lower viscosity. The results showed that after hot water treatments, the maximum solid concentration of Xiaolongtan CWS increased from 44.6% to 64.55%, while that of MIP CWS increased from 39.71% to 64.61%. The improvement of LRC slurry ability depended much on the final temperature of hot water treatments. The mechanism was explained by the chemical analysis of oxygen-containing groups and the measurement of contact angle between coal surface and water.

Key words

[low rank coal](#) [coal water slurry](#) [hot water treatment](#) [oxygen-containing groups](#) [contact angle](#)

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