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Review

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The impacts of stress on the chemical structure of coals: A mini-review based on the recent development of mechanochemistry

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Abstract

The chemical structure evolution of coal, which is important for understanding coalification and the accompanying volatile and possible oil generation, is generally thought to be influenced by temperature, time and confining pressure. Though evidence concerning the impacts of stress on the chemical structure has accumulated for many years and some hypotheses have been proposed, the mechanism remains controversial. Recent years have seen a breakthrough in mechanochemistry, which proves that stress can act on the molecule directly to initiate or accelerate reactions by deforming the chemical bonds. The progress in mechanochemistry gives researchers incentive to consider how stress works on the chemical structure of coals. Preliminary quantum chemical calculations have been performed on the macromolecule of anthracite to explain the mechanism of gas generation during the deformation experiments at low temperatures. This paper briefly reviews the evidence regarding the impacts of stress on the chemical structure of coals and introduces the recent

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