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Investigating the effect of thermal shock on coal

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Thermal cracking occurs easily in processes that entail a steep temperature gradient and high pressure (like blast furnaces and gasifiers) and merits further investigation since the alteration of the coal structure during these conditions will consequently affect the behavior of the resulting char. The fractures that develop during these initial phases of reaction open up pathways to reaction sites and consequently affect the reactivity of the coal. This investigation deals with establishing the mechanism of development and spread of fractures associated with thermal shock through the coal structure as well as to make conclusions regarding the reactivity of the resulting char. More specifically, conclusions regarding the effect of the bedding plane (direction), specific macerals involved in crack propagation and size and distribution of minerals with respect to crack origin will be made. Micro-focus X-ray tomography is a very attractive method to investigate these processes in a quasi dynamic manner since the non-destructive nature of this analytical technique permits using the same sample during numerous stages of a process. Investigating the process of thermal shock requires developing a suitable experimental method to induce and track the induced fractures and consequently an experimental setup and procedure is proposed by utilizing a RF coil to induce a very steep temperature gradient within a graphite cylinder which encapsulates the sample under investigation, whilst micro-focus X-ray tomography will be utilized to quantify the associated alter

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Maybe

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