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## The qualification of coal degradation with the aid of micro-focus computed tomography

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The production of unwanted fines and ultra-fines during the handling and utilization of coal is a serious problem in processes that rely on large or closely sized particles. Degradation of coal occurs at a number of different places within the beneficiation or utilization processes and through a number of different mechanisms, none of which is thoroughly understood. In an effort to gain a better understanding of the degradation mechanisms, micro-focus computed tomography ( $\mu$ -CT) was used to track the changes within a number of coal particles. The observed changes were caused by impact- and compression loading as well as rapid temperature increases. The resolution of the  $\mu$ -CT tomograms allowed that the micro-structure within the coal particles could be identified and the influence of these structures on the degradation qualified. A comparison of the tomograms taken before and after breakage and fracture showed that the micro-structure of coal had an influence on the breakage characteristics. For compressive and impact loading, the biggest structural contributor was shown to be the network of existing cracks and cleats within a particle and the direction of the load application is the biggest contributor to the directionality of the newly formed cracks. For rapid temperature increases, an increase in new crack formation occurred with an increase in final temperature as well as heating rate; there is also increased crack formation in the lower density macerals.

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Maybe

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