

Sensing Underground Coal Gasification by Ground Penetrating Radar

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Abstract

The paper describes the results of research on the applicability of the ground penetrating radar (GPR) method for remote sensing and monitoring of the underground coal gasification (UCG) processes. The gasification of coal in a bed entails various technological problems and poses risks to the environment. Therefore, in parallel with research on coal gasification technologies, it is necessary to develop techniques for remote sensing of the process environment. One such technique may be the radar method, which allows imaging of regions of mass loss (voids, fissures) in coal during and after carrying out a gasification process in the bed. The paper describes two research experiments. The first one was carried out on a large-scale model constructed on the surface. It simulated a coal seam in natural geological conditions. A second experiment was performed in a shallow coal deposit maintained in a disused mine and kept accessible for research purposes. Tests performed in the laboratory and in situ conditions showed that the method provides valuable data for assessing and monitoring gasification surfaces in the UCG processes. The advantage of the GPR method is its high resolution and the possibility of determining the spatial shape of various zones and forms created in the coal by the gasification process.

Key words: GPR, coal, gasification, sensing.

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