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RAPID PYROLYSIS OF SERBIAN SOFT BROWN COALS

ABSTRACT

Soft brown coals of the open coal fields of Kolubara and Kostolac are the main domestic energy sources of Serbia. This paper presents the results of investigations on rapid devolatilization of these two coals which have covered kinetics of devolatilization (based on total volatile yield), forms of sulphur and petrographic analysis of coal and char. Experiments of devolatilization were performed in inert gas (N₂) at atmospheric pressure and in batch-type hot-wire screen reactor. The mass-loss values of both coals at selected final reaction temperatures (300-900 °C) and retention times (3-28 s) were obtained. Anthony and Howard's kinetic model was applied over two temperature ranges (300-500 and 700-900 °C). The types of sulphur as monosulphide, sulphate, pyritic, and organic sulphur were determined for chars and original coals. Strong transformation of pyrite was evident even at low temperatures (300 °C). Devolatilization of all types of sulphur has started over 600 and at 900 °C the content of sulphur in char remained only 66% of total sulphur in original coal. Microscopic investigations were carried out on samples prepared for reflected light measurements. The petrographic analysis included: the ratio of unchanged and changed coal, maceral types, the share of cenospheres, isotropic mixed carbonized grains, mixed grains, small fragments, clay, and pyrite. The change of the structure of devolatilized coal was also observed.

KEYWORDS

[lignite](#), [rapid devolatilization](#), [sulphur](#), [petrographic analysis](#)

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