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# THERMAL SCIENCE

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Vasilije Manović, Borislav Grubor, Mladen Ilić

### A SINGLE, PARTICLE-SIZE MODEL OF SULFUR SELF-RETENTION - A GRAIN MODEL APPROACH

#### ABSTRACT

A developed overall model for sulfur self-retention in ash during coal particle combustion is presented in the paper. The total sulfur content in char, after devolatilization, is evaluated using a derived correlation. It is assumed that sulfur retention during char combustion occurs due to the reaction between SO<sub>2</sub> and the active part of the Ca in the form of uniformly distributed CaO grains. Parametric analysis shows that the process is limited by solid diffusion through the product layer formed on the CaO grains and that the most important coal characteristics which influence sulfur self-retention are coal rank, content of sulfur forms, molar Ca/S ratio and particle radius. The model predicts relatively well the levels of the experimentally obtained values of SSR efficiencies, as well as the influence of temperature, particle size and the surrounding conditions.

#### KEYWORDS

coal, combustion, sulfur retention by ash, modelling

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