

# **The influence of the particle size of the gasified material on the absorption of sulfur during filtration combustion sulfur coal with marble**

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The presence of sulfur in coals significantly constrains their use in the chemical industry and energy, therefore, the search for environmentally friendly ways of processing coals becomes a very urgent task. Our experiments on gasification of mixtures of sulfur dioxide and marble particles have shown that the addition of up to 50% marble to the gasified material allows to absorb up to 37% of the sulfur contained in the coal. The aim of this work was to find ways to increase the proportion of absorbed sulfur during the gasification of high-sulfur brown coals in the filtration combustion mode. The subject of the study was to study the effect of the particle size of coal and marble on the proportion of absorbed sulfur.

Experiments on gasification of mixtures of coal and marble particles were carried out in a quartz reactor with a diameter of 45 mm, the size of the coal and marble particles used was 1.5, 2.5, 5.0 and 7.5 mm. The object of the study was the sulphurous brown coal of the Moscow basin. The coal content in the gasified mixture was 50%.

Experiments have shown that temperature of combustion practically does not change with decreasing particle size, the rate of combustion increases linearly, and the content of carbon monoxide in gaseous products increases significantly. The heat of combustion of gaseous products of gasification increases from 2.0 to 3.0 MJ/m<sup>3</sup>. The proportion of absorbed sulfur with a change in particle size from 7.5 to 2.5 mm changed little, increasing from about 37 to 43%, and with the gasification of a mixture with a particle size of 1.5 mm increased to about 60%.

Thus, with a decrease in the particle size, the proportion of absorbed sulfur increases, but in order to significantly increase the amount of absorbed sulfur, the particle size must be reduced by five or more times.

The measurements of the elemental composition of the materials used and the combustion products were carried out in the Analytical center for collaborative using of the IPCP RAS.

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