

CARBON DIOXIDE BINDING IN THE HETEROGENEOUS SYSTEMS FORMED AT COMBUSTION OF OIL SHALE 3. TRANSFORMATIONS IN THE SYSTEM SUSPENSION OF ASH – FLUE GASES

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Power production based on oil shale combustion is accompanied by high carbon dioxide emissions and by the formation of alkaline waste ash. A set of laboratory experiments was carried out in order to investigate the interactions in the heterogeneous system: water suspension of ash – flue gases. Suspensions of ash were treated with model gases imitating the content of CO₂ and SO₂ in flue gases and air. Comparative experiments were carried out using the model system: suspension of pure CaO – flue gases. The aim of the experiments was to achieve the complete carbonation of oil shale ash by CO₂ from flue gases.

Experiments indicated that ash can be completely carbonated if the pH value of suspensions decreases to 9–7. The total amount of bound CO₂ reached up to 153.8 kg per ton of oil shale ash or 70.8 kg per ton of oil shale burnt for electricity production. The part of bound CO₂ formed 35.6 and 7.3 % from the carbonate and total emission of CO₂, respectively. Due to carbon dioxide binding, alkaline ash will be chemically stabilized and its hazardous environmental effect decreased.