In Russia’s new Energy Program, the Government of the Russian Federation has put forward an objective according to which the fraction of coal in the country’s energy balance must be increased by approximately a factor of 1.5 by 2020 [1]. The growth of production rates and increase in the coal cleaning fraction will entail a growth of wastes from the coal-mining industry containing an organic component. The amounts of this component are sufficient for their commercial-grade use; however, this component is not quite suitable for processing with the use of existing traditional technologies. High-ash sludges from coal-cleaning factories, culm, and sifting generated during a coal mining process, as well as low-grade coals, can be related to the category of such wastes. On February 27, 2013, the Ministry of the Russian Federation for Energy held a meeting of the Scientific-Technical Council of the Coal Industry, which was devoted to the concept of the project called “Development of a Standard Energy Technology Complex for Integrated Processing of Low-Grade Coals and Wastes from the Coal-Mining Industry with Producing Engine Fuels and Generating Power and Heat.” According to this concept, development of technologies for nonfuel use of the organic part of low-grade coals and wastes generated from the coal-mining industry by means of steam conversion are presented. The study results presented in this work are aimed at implementing a technology for subjecting wastes from the coal-mining industry to conversion by means of superheated steam to obtain medium-calorific fuel gas or synthesis gas for the chemical industry, e.g., for producing synthetic liquid fuels.

The experimental investigations of steam-assisted gasification of coal containing wastes were carried out on an experimental setup the design of which is schematically shown in Fig. 1. Samples of coal wastes were subjected to conversion in a dense layer of particles in the medium of steam superheated to a temperature of up to 1200 °C without access of oxygen at a pressure slightly higher than the atmospheric pressure. Superheated steam was obtained by firing a stoichiometric hydrogen–oxygen mixture in steam flow [3]. The flowrates of steam and combustible mixture were equal to 5–10 l/min (t = 120–130 °C) and 2–5 l/min, respectively. Coal wastes (culm) from the Berezovskaya coal mine with moisture content $W_a = 1.08\%$, content of volatiles $\nu = 19.27\%$, ash content $A_d = 9.59\%$, and elemental composition N = 1.51%, C = 77.27%, and H = 3.94% were used as initial material. The material was preliminarily subjected to carbonization (during which the volatiles were removed) by holding it at a temperature of 600 °C for 30 min. The fraction composition of particles varied in the range 3–4 mm, and the mass of a sample was around 2.5 g. The concentrations of reaction products (CO, 

**Abstract**—Results from work on experimentally studying and numerically simulating gasification of low-grade coals and wastes generated from the coal-mining industry by means of steam conversion are presented. The mass concentrations of the gas phase components $H_2$ and CO obtained at different values of the steam flowrate-to-initial material feed ratio are determined from the calculation results.

**Keywords**: steam-assisted gasification, wastes from coal production and coal cleaning, numerical simulation, gasification kinetics

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