DETERMINATION OF OXIDATIVE ENERGY-TECHNOLOGICAL PROCESSING OF LIGNITE

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Many works have been devoted to research on lignite processing. The main areas are: use as energy fuel, production of combustible artificial gases during its processing by gasification, production of sorbents and humic substances, etc. [1–4].

The annual rise in energy prices, such as natural gas and oil, encourages researchers to find new ways to process lignite, the deposits of which in Ukraine are measured in millions of tons, which will combine the two main tasks: 1) use of energy and chemical potential of lignite; 2) be environmentally safe for the environment.

Qualitative indicators of the products obtained during the oxidative energy-technological processing of lignite of the Olexandria deposit were

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determined. Characteristics of the experimental sample of lignite are given in table 1.

Table 1

Characteristics of lignite

Proximate analysis %				**Ultimate analysis %**				**Heat of combustion, MJ/kg**	
								1. Higher	**2. Lower**
W_t^r	A^d	S_t^d	V^{daf}	C^{daf}	H^{daf}	N^{daf}	O^{daf}_d	Qs^{daf}	Q_i^r
9.4	39.8	2.74	70.8	67.60	6.95	0.90	21.86	32.79	17.04

The research was carried out in the first stage of the laboratory installation [5, p. 148]. Conducting the experiment: a sample of lignite weighing 20 ± 0.0001 g was placed in a preheated furnace and kept for 40 minutes. The furnace temperature was 400 or 500 °C. Air consumption (AC) – 0.002; 0.003 or 0.004 m^3/minute. At the end of the experiment, the cooled residue and condensed products were removed, cooled and weighed to an accuracy of ± 0.0001 g. Based on the obtained results, graphical dependences of material balance indicators were constructed, namely: yield of solid residue (SR), condensed (CP) and gaseous (GP) products, from air consumption (AC) and presented in Figure 1, 2, 3.

In determining the component composition of condensed products obtained after processing of lignite, 52 main compounds were identified, among them (%): phenols (4.46), naphthalene (2.87), butylated hydroxytiluene (7.94), phenanthrene (2.70), cresols (2.81), fluorene (0.96) and the like. The main components of gaseous products vary within (%): CO 14-26; H_2 10-17; CH_4 0.2-0.5; C_mH_n 4-6.

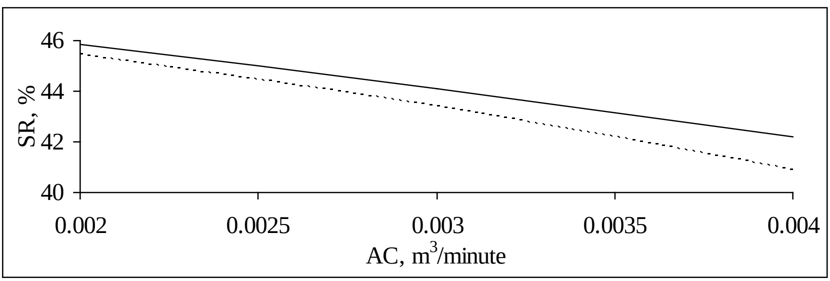

Figure 1. Graphic dependence of SR on AC at temperature 400 °C (–) and 500 °C (- – -)

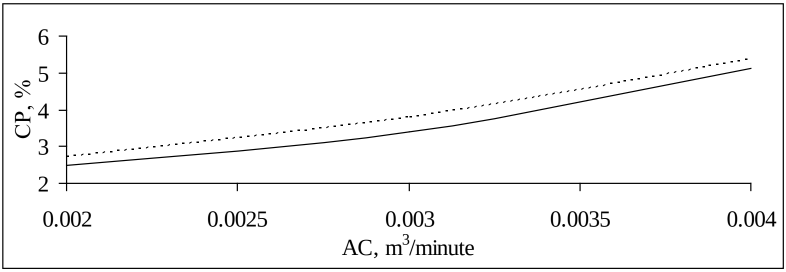

Figure 2. Graphic dependence of CP on AC at temperature 400 °C (–) and 500 °C (- – -)

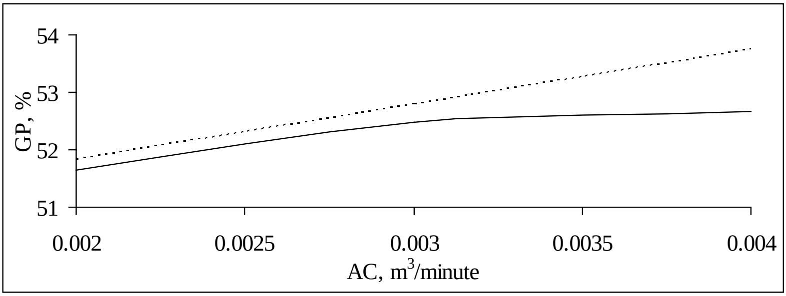

Figure 3. Graphic dependence of GP on AC at temperature 400 °C (–) and 500 °C (- – -)

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