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THE INFLUENCE OF THE GRANULOMETRIC COMPOSITION OF THE SOLID DISPERSE PHASE ON THE RHEOLOGICAL PROPERTIES OF OIL-WATER-COAL DISPERSE SYSTEMS BASED ON ANTHRACITE

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In Under conditions of energy shortage, an effective solution to this problem is the development of fuel dispersed systems consisting of coals of varying degrees of metamorphism, as well as liquid dispersion media of various chemical nature. The best-known kind of liquid dispersion fuel is coal-water suspension, which has several advantages over individual burning of coal. But one of its drawbacks is the low calorific value because of using up to 40 % of water by weight of coal in the system.

For the efficient combustion of coal-based liquid fuel, the water content in it has to be at level of 10-15 %. Therefore, it was proposed to replace part of the aqueous medium with organic liquids: waste oils, oil sludge, fusel oils. Such a suspension fuel will have an energy efficiency of 1.5-2.0 times more than calorific value of coal. This makes it possible, if necessary, to obtain a higher temperature in the furnace space, as well as to realize a more complete burning of coals of various stages of metamorphism.

Oil-water-carbon dispersed system (OWCDS) has been considered based on anthracite (A^d = 20.5 %) with a concentration of solid phase C_m = 40 %, oil phase concentration C_m = 49 % and water concentration C_{H2O} = 10 %. The stability of this system and the rheological properties of oil- water-coal dispersions based on anthracite with different particle size distribution has been investigated. It was established that the best solid particle size distribution for anthracite-based dispersions is multimodal. In this case the system is characterized by a viscosity of 0.66 Pa · s and high sedimentation stability (at least 14 days). The rheological properties and stability of OWCDS can be controlled by changing the particle size distribution of coal depending on operational need.

Keywords: oil-water-coal dispersed systems, emulsion, suspension, dispersed phase, anthracite, particle size distribution, rheological properties.

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