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Adsorption of Non-ionic Surface Active Agent on Fine Coal and Lignite

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Abstract: The adsorption of Triton X-100 in aqueous solution on the less than 53 μm size fractions of Tunçbilek lignite and Zonguldak bituminous coal was studied. The adsorption isotherms were formed for 5, 30 and 1,440 (equilibrium) minutes. The isotherms were evaluated using both Langmuir and Freundlich adsorption equations. Concentrations of the reagent in the monolayer after equilibrium adsorption were determined to be 8.17 and 7.27 $\mu\text{M/g}$ coal for the lignite and bituminous coal using the Langmuir adsorption equation. The specific adsorption capacity per unit area of Zonguldak bituminous coal was 5.3 times higher than that of Tunçbilek lignite. The adsorption kinetic tests were also conducted with the reagent and coal samples used in the study. The experimental data indicated that there were two very different adsorption rates, one being fast and the other very slow. A large amount of the reagent was adsorbed on the solid surface during the fast adsorption stage.

Key Words: Reagent adsorption, adsorption kinetics, coal-lignite

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