Studies on the adsorption of phenol on dried sewage sludge and solid gasification by-products

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\textbf{ABSTRACT}

Dried sewage sludge and solid gasification byproducts (ash) were evaluated in terms of their application to the removal of phenol from aqueous solutions by adsorption. The adsorption was carried out under static conditions at 20˚C. The following properties of the tested unconventional adsorbent materials were determined: susceptibility of phenol to adsorption, the equilibration time and the adsorption isotherms based on the Langmuir and Freundlich equations. Additionally, leaching of primary inorganic and organic substances from adsorption materials was studied including the determination of a toxic effect of the solution (without the addition of phenol). It was found that the gasification ash adsorbs phenol better than dried sewage sludge. The results obtained for the adsorption of phenol on the ash were described by both isotherms with great accuracy. In the case of dried sludge, the Freundlich isotherm made it possible to obtain a better correlation coefficient. It was observed that organic and inorganic substances are leached from the adsorption materials in deionized water. The intensity of this phenomenon was greater for dried sludge than for the ash. It was observed that the toxic effect of this solution increased. The efficiency of adsorption of phenol on conventional and unconventional adsorbents (including those analyzed in detail) was also determined in this study.

\textbf{Keywords}: Phenol; Adsorption; Dried sewage sludge; Gasification; Gasification by-products; Ash; Adsorption isotherms

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