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Adsorption of Phenol from Aqueous Solution on Various Sorbents

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Nowadays, phenols belong to the most common water pollutants in the industrial effluents thus they have become the significant contaminant of ground waters. The underground coal gasification technology (UCG) belongs, among other, to sources of contaminated phenolic water. Phenolic compounds can be also found in wastewater generated by petroleum and petrochemical, pharmaceutical, plastic, rubber proofing, steel, and phenol production industries.¹ Phenolic compounds have low allowable limits (0.5–1.0 mg/l) in the effluent of industrial water, thus, it is inevitable to remove them from any water by environmentally acceptable ways mainly due to their high toxicity to human and aquatic life.²

For this reason, this study is focused on an evaluation of an individual sorbent efficiency and capacity concerning phenol removal from waste and/or industrial water by sorption techniques.

Two types of activated carbons (Supersorbon – extrudates, and Norit – powder) were applied as sorbents for contaminated water treatment. Efficiency of the individual sorbents was tested on model contaminated water with the various phenol concentrations. Applied sorbents were thoroughly characterized by various methods as Nitrogen physical adsorption, Mercury porosimetry and Helium pycnometry. The particle size distribution of Norit was performed by a sieve analysis.

All sorption experiments were carried out under continuous shaking in a laboratory batch arrangement at room conditions. For the exact description of the phenol sorption on activated carbons the kinetic equilibrium and sorption capacity were determined. Sorption activity of Supersorbon and Norit was tested on the phenol removal from the UCG real wastewater.

References

1. Nayak, P. S.; Singh, B. K. *Desalination* **2007**, *207*, 71.
2. Polat, H.; Molva, M.; Polat, M. *Int. J. Miner. Process.* **2006**, *79*, 264–273.