Adsorption of Phenol in the Radioactivate Liquid Waste by Activated Carbon Fibers

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The effect of metal treatment on the adsorption of activated carbon fibers(ACFs) was investingated in the context of phenol adsorption. 1wt% the metal ions cobalt(Ⅱ), nickel(Ⅱ), copper(Ⅱ) and zink(Ⅱ) solution were used for metal treated. The specific surface area and the pore structure were evaluated from nitrogen adsorption data at 77 K. The phenol adsorption rate onto ACFs were measured by uv-vis spectrophotometer. As a result, the average pore diameter of reference-ACF and Cu-ACF was in the mesopore regions of 30-40Å and 200-300Å with micropore. Iodine adsorption capacity of Cu-ACF is much better than that of the reference-ACFs. The reference-ACF with mesopores is more efficient than the other adsorbents for the adsorption of polymer such as methyleneblue. The adsorption capacity of reference-ACF and Metal-ACFs were increased in order of Cu-ACF>Ni-ACF>Co-ACF>Zn-ACF>Reference-ACF, in spite of a decrease in specific surface area which was resulted from pore blocking by metal. The adsorption rate of Metal-ACFs for phenol is 18 time faster than that of Activate carbon(AC). The adsorption amount of phenol on Cu-ACF at breakpoint was 1.8 times larger than reference-ACF.

This work, from a view point of their adsorption properties, suggest that ACFs provide a promising tool forth treatment of phenol contained in the decontaminated radioactive liquid waste