New carbon adsorbent from polymer waste for effective removal of mercury from water

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ABSTRACT

Adsorption of mercury ions on activated carbon, prepared from polymer waste product, polyolefin wax (POW), was studied. The structure and surface properties of the sample are characterized by different methods—N₂ adsorption, IR spectroscopy, determination of surface oxygen groups. Adsorption studies of mercury(II) from aqueous solution on synthesized activated carbon are investigated under various conditions—agitation time, metal ion concentration, adsorbent quantity, pH. It was established that the adsorption follows both Langmuir and Freundlich isotherms. The activated carbon obtained from POW demonstrates high adsorption capacity toward mercury ions (196.1 mg/g). The results show that Hg²⁺ removal from water solutions increases with the increase of pH from 2 to 5, and slightly decreases at pH > 6.

Keywords: Polymer waste; Activated carbon; Adsorption; Mercury

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