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# Effect of Halide Impregnation on Elemental Mercury Removal of Activated Carbons

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## Abstract


Activated carbons (ACs) were impregnated with potassium halides (KX) to enhance the removal efficiency of elemental mercury ($Hg^0$). In this work, the impregnation effect of potassium bromide (KBr) and potassium iodine (KI) were investigated. The surface properties of KXÃƒÂ¢Ã‚Â€Ã‚Â•ACs were determined by scanning electron microscopy (SEM) and energy dispersive spectroscopy (EDS). The pore structures and total pore volumes of the KXÃƒÂ¢Ã‚Â€Ã‚Â•ACs were analyzed using the $N_2$

/77Ãƒ Â¢Ã‚Â€Ã‚Â‰K adsorption isotherms. The $Hg^0$ removal efficiency of KBrÃƒ Â¢Ã‚Â€Ã‚Â•ACs and KIÃƒ Â¢Ã‚Â€Ã‚Â•ACs was studied under simulated flue gas conditions. The effects of KI and KBr loading, adsorption temperature, and flue gas components on $Hg^0$ removal efficiency were also investigated. The results showed that the $Hg^0$ removal efficiency of the ACs was significantly enhanced by KI or KBr impregnation, and KIÃƒ Â¢Ã‚Â€Ã‚Â•ACs showed higher $Hg^0$ removal efficiency than KBrÃƒ Â¢Ã‚Â€Ã‚Â•ACs under the same conditions. An increase in KI or KBr loading and higher adsorption temperatures improved the $Hg^0$ removal efficiency, indicating that chemisorption occurred due to the reaction between $X^{Ã\ƒ Â¢Ã‚Â€Ã‚Â˜Ã‚Â’}$ and $Hg^0$. The lower extent of $Hg^0$ removal exhibited by the KBrÃƒ Â¢Ã‚Â€Ã‚Â•ACs than by the KIÃƒ Â¢Ã‚Â€Ã‚Â•ACs was due to the difficulty of $Br_2$ formation on the surfaces.



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