

Competitive adsorption capacities of anionic contaminants on cationic surfactant modified powdered activated carbon (PAC) between single and multi contaminant system

홍혜진, 김호정, 양지원*
한국과학기술원
(jiwonyang@kaist.ac.kr*)

Powdered activated carbon (PAC) modified by cationic surfactant has high adsorption capacities to anionic contaminants. It is used to remove arsenate (H_2AsO_4^-), chromate (CrO_4^{2-}) and ferricyanide ($\text{Fe}(\text{CN})_6^{3-}$) in this study. Adsorption capacity of virgin activated carbon is less than 0.03 mmol of anionic pollutant per 1 g of PAC. However, adsorption capacity of PAC increases by modifying the virgin PAC with cationic surfactant. Adsorbed mass of H_2AsO_4^- , CrO_4^{2-} and $\text{Fe}(\text{CN})_6^{3-}$ on modified PAC are enhanced as 0.1, 0.25, 0.13 mmol/g, respectively. Adsorbed mass of CrO_4^{2-} is nearly twice higher than those of H_2AsO_4^- and $\text{Fe}(\text{CN})_6^{3-}$. Adsorption capacity of modified PAC to H_2AsO_4^- and $\text{Fe}(\text{CN})_6^{3-}$ are similar. However, in multi-contaminants system, Adsorption capacities of three anionic contaminants are different. Because of valence effect, trivalent ferricyanide shows the highest adsorption affinity to modified PAC. Therefore adsorption of $\text{Fe}(\text{CN})_6^{3-}$ increases with equilibrium concentration. Whereas adsorbed CrO_4^{2-} and H_2AsO_4^- are detached to aqueous phase.