

عنوان مقاله:

Fabrication of ultrathin graphene oxide-coated membrane with hydrophilic properties for arsenate removal from water

محل انتشار:

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خلاصه مقاله:

Terms and conditions of current drinking water quality standards, including reducing the maximum arsenic concentration from 50 $\mu\text{g l}^{-1}$ to 10 $\mu\text{g l}^{-1}$ and predicted stricter standards in future, reveals the necessity for development of new technologies. This study aimed to prepare and evaluate a new nanocomposite membrane using graphene oxide (GO) thin layer to remove arsenic (v) from water. To fabricate the membrane, initially GO was prepared using the modified Hummers method and then to gain a narrow-dispersed GO dispersion, several times centrifugation and sonication were performed. Then resultant dispersed GO was coated on a microporous flat-sheet polyethersulfone support by coating/deposition and vacuum filtration process. Performance of the synthesized membrane was assessed using a dead end filtration system. The results showed that pure water flux decreased as the coated GO thickness increased. Among the three prepared membranes, the greatest flux was attributed to M1 membrane with the value of 398.5 $\text{lm}^{-2}\text{h}^{-1}$ and the minimum flux was for M3 with a value of 131.3 $\text{lm}^{-2}\text{h}^{-1}$ at 4 bar of pressure. Furthermore, by increasing the coated GO, rejection of arsenate ions increased significantly. With initial concentration of $1000 \pm 20 \mu\text{g l}^{-1}$, percentage of arsenate rejection for M1, M2 and M3 membranes were 41.8%, 73.5% and 86.7%, respectively. Relatively high removal by this novel membrane can be due to the exceptional properties of GO nanostructure and the presence of hydrophilic functional groups.

کلمات کلیدی:

Membrane, Nanocomposite, Drinking water, Arsenate

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