Recent advances in electrospun fibrous membranes for effective chromium (VI) removal from water

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ABSTRACT

The accumulation of heavy metals in aquatic environments is a significant environmental threat. Among the available methods for their removal, adsorption using nanofiber has been proven to be the most effective approach. The unique architecture of nanofibers provides them with intriguing features, such as high specific surface area and pore density, which makes them capable of removing harmful metals and a potential solution for various applications, including water treatment. This new generation of highly porous membranes is expected to have a promising future in separation applications due to its unique properties, including 90% porosity and 3D interconnected pore structure. Electrospinning is a well-regarded technique for creating such unique porous membranes. Among the various metal ions, chromium (Cr(VI)) removal has been extensively researched, and electrospun nanofiber membranes have proven to be an effective adsorbent. The objective of this review is to provide up-to-date information on the most common ways that electrospun nanofiber membranes are utilized for the removal of Cr(VI) ions from water. The findings indicate that electrospun fibrous materials are effective in eliminating Cr(VI) and establish their suitability for decontaminating polluted water. However, further attention is required to enhance the stability, mechanical strength, and reusability of these fibrous membranes.

KEYWORDS

Adsorption; Chromium ions; Electrospinning; Heavy metals; Nanofiber; Water treatment

ACKNOWLEDGEMENTS

G.A.M. Ali would like to thank the Egyptian Academy of Scientific Research and Technology (ASRT, Project No. 19402). In addition, A. A. Guda would like to thank the support of the Strategic Academic Leadership Program of Southern Federal University (Priority 2030). This study was supported by the National Research Foundation (NRF) of the Republic of Korea under the frameworks of the Priority Research Centers Program (NRF-2014R1A6A1031189) funded by the Ministry of Education, the Republic of Korea and the Consolidator Grant Program (NRF 2023R1A2C2007955) funded by the Ministry of Science and ICT, The Republic of Korea. In addition, the authors are grateful for the financial support by USAID Partnerships for Enhanced Engagement in Research (PEER) Program an international grants program that funds scientists and engineers in developing countries who partner with U.S. government-funded researchers to address global development challenges. The U.S. National Academies of Sciences administered it, Engineering and Medicine (NASEM), PEER/Iraq project/cycle 6.