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DESIGN OF MATERIALS FOR TOTAL CHROMIUM REMOVAL

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Hexavalent chromium (Cr(VI)) is toxic and carcinogenic to humans and plants. Its sources in nature include discharge from electroplating, chrome mining, paints and pigment, leather tanning, and textile industries. Methods such as chemical precipitation, reverse osmosis, ion exchange, adsorption and coagulations have been used for the removal of Cr(VI) from the environment. Among these, adsorption methods have enjoyed widespread acceptance due to their simplicity, cost effectiveness and offer fine-tuning of functional groups on the surface of adsorbents. To that extent, numerous adsorbents have been developed from synthetic polymers, biomass, clays, and natural polymers. Even though these adsorbents have shown promising applications but there has been challenges with regards to Cr(VI) removal. One of those challenges is the highly oxidative nature of Cr(VI) which tend to get reduced to its trivalent form (Cr(III)) during adsorption leading to incomplete removal of total chromium. Our studies have thus focused on developing adsorbents for the removal of both forms of chromium, sequentially or simultaneously. Biomass based adsorbents and ion imprinted polymers have been utilized in this study. Various modifications of Macadamia nutshells and mango kernels were explored for the removal of chromium and adsorption performance improved following ligand immobilization.

Biography

Vusumzi E Pakade has completed his PhD in Environmental Analytical Chemistry at University of the Witwatersrand. His PhD was on the synthesis and application of molecularly imprinted polymers for trace metal removal and recovery of organic compounds from wastes. He has worked as a Senior Lecturer at Vaal University of Technology, South Africa. He has published more than 25 papers and book chapters in reputable journals and has been serving as a research representative in the Faculty Research and Innovation Committee.

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