Poster Presentation

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Novel materials from clay and functionalized clay nanoparticles

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The importance of water purification especially removal of both organic and inorganic contaminants cannot be overemphasized, hence the need to develop water purification materials that are cheap, easily available and efficient. This would ensure realization of the Clean Water and Sanitation Sustainable Development Goal (SDGs). The current study involves isolation of clay nanoparticles (CNP) and functionalizing them with Cetylpyridinium Chloride (CPC) and Tetradecyltrimethylammonium Bromide (TTAB) to form C-CPC and C-TTAB respectively, so as to increase efficiency in removal of lead, cadmium and pentachlorophenol (PCP) through batch process. Clay was acquired locally, purified and CNP isolated by sedimentation and centrifugation. The CNP, C-CPC and C-TTAB were characterized using Fourier Transform Infra-Red (FTIR) spectroscopy, X-Ray Diffractometry (XRD), Scanning Electron Microscopy (SEM) and High Resolution Transmission Electron Microscopy (HRTEM). HRTEM revealed a particle size of 12-15 nm for the three adsorbents. CNP had a lead removal efficiency of 88% at initial concentration of 80 ppm and 94% for Cadmium at initial concentration of 50 ppm, while C-CPC and C-TTAB had lead removal efficiencies of 98%. For cadmium removal, C-CPC and C-TTAB had 98.2% and 98.6% efficiencies respectively. In pentachlorophenol (PCP) adsorption, CNP, C-CPC and C-TTAB had removal efficiencies of 85.6%, 87.7% and 84.6% respectively. The findings suggest that isolation of CNP and consequent modification with the surfactants increases adsorption efficiency of clay against the water pollutants.

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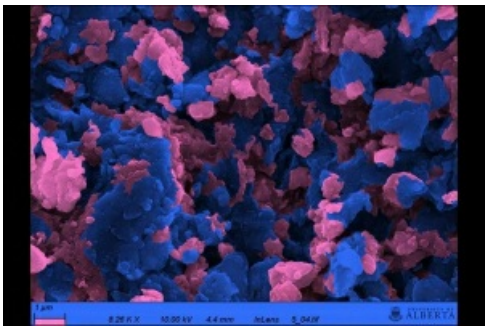

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