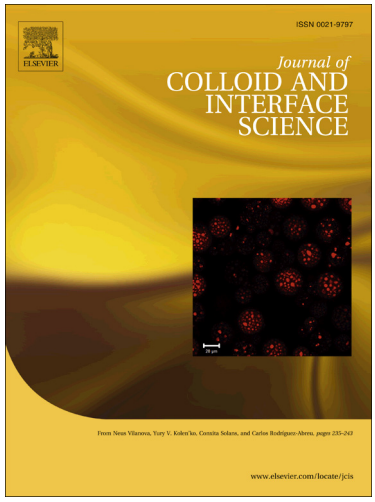

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Novel deep eutectic solvent-functionalized carbon nanotubes adsorbent for mercury removal from water

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Abstract

Due to the interestingly tolerated physicochemical properties of deep eutectic solvents (DESs), they are currently in the process of becoming widely used in many fields of science. Herein, we present a novel Hg^{2+} adsorbent that is based on carbon nanotubes (CNTs) functionalized by DESs. A DES formed from tetra-n-butyl ammonium bromide (TBAB) and glycerol (Gly) was used as a functionalization agent for CNTs. This novel adsorbent was characterized using Raman spectroscopy, Fourier transform infrared (FTIR) spectroscopy, XRD, FESEM, EDX, BET surface area, and Zeta potential. Later, Hg^{2+} adsorption conditions were optimized using response surface methodology (RSM). A pseudo-second order model accurately described the adsorption of Hg^{2+}. The Langmuir and Freundlich isotherms models described the absorption of Hg^{2+} on the novel adsorbent with acceptable accuracy. The maximum adsorption capacity was found to be 177.76 mg/g.