



Research Article



Development of Nanocomposite adsorbent, Electrical conductivity, Photolytic degradation and Analytical applications for the treatment of metals

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ABSTRACT

In this paper we describe synthesis of nanocomposite polyanilineTi (IV) as cation exchange adsorbent,

electrical conductivity, photolytic degradation and analytical applications for the treatment of metals. The experimental parameters such as mixing volume ratio, concentration and pH were established for the synthesis of the material. Ion-exchange material was synthesized at pH 1.0 shows an ion exchange capacity of 1.37 meq g⁻¹ for Na⁺ ions. Bifunctional behavior of the material has been indicated by its pH titrations curves. The material was found to be granular and can be conveniently used in column operations. The synthesized composite material exhibits improved thermal stability, ion exchange capacity and selectivity for heavy metal ions. The material was characterized by using analytical techniques namely FTIR, TGA-DTA, XRD, SEM, TEM and elemental analysis. The distribution coefficient studies of metal ions on the material were performed in different concentration of surfactants and the mixture (solvent + surfactant). On the basis of K_d values the material was found to be selective for Hg (II), Bi (III), Zr (IV) and Pb (II) ions. Some binary separations of metal ions in synthetic mixtures were achieved on the column of the above cited composite ion exchanger.

Keywords: Nanocomposite polyanilineTi (IV), FTIR, TGA-DTA, XRD, SEM, TEM.

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