

Kinetics of Cu (II) Adsorption on Organo-Montmorillonite

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Abstract

Commercially available montmorillonite (Mt) was converted to organo-montmorillonite by grafting with tetramethylammonium (TMA) and tetrapropylammonium (TPA) cations to obtain potential adsorbents for metal cations. TMA-Mt and TPA-Mt showed IR bands at 1489 cm^{-1} and 1389 cm^{-1} attributed to C-N vibrations in tertiary amines and σ_{as} (C-H) bending vibrations due to CH_3 groups of the $(\text{CH}_3)_4\text{N}^+$ cation, indicating intercalation of Mt with TMA and TPA. The basal spacings obtained from the XRD data showed marginal increase due to introduction of the quarternary ammonium ions. The CEC of Mt, TMA-Mt and TPA-Mt were 220, 294 and 257 cmol/g respectively showing an increasing order with modification of the clay. Cu(II) adsorption on the adsorbents showed that the interactions conformed to second order kinetics with the second order rate coefficient of 1.06×10^{-2} , 9.00×10^{-3} and $1.31 \times 10^{-2}\text{ L mg}^{-1}\text{ min}^{-1}$ respectively for Mt, TMA-Mt and TPA-Mt.

Keywords: Cu(II) Adsorption Kinetics, TMA-Montmorillonite, TPA-Montmorillonite