Preparation of New Organoclays and Applications for Adsorption of Telon Dyes in Aqueous Solutions

Authors : Benamar Makhoukhi

Abstract : Clay ion-exchange using bismidazolium salts (MBIM) could provide organophilic clays materials that allow effective retention of polluting dyes. The present investigations deal with bentonite (Bt) modification using (ortho, meta and para) bisimidazolium cations and attempts to remove a synthetic textile dyes, such as (Telon-Orange, Telon-Red and Telon-Blue) by adsorption, from aqueous solutions. The surface modification of MBIM–Bt was examined using infrared spectroscopy (FTIR), X-ray diffraction (XRD) and thermogravimetric analysis (TGA). Adsorption tests applied to Telon dyes revealed a significant increase of the maximum adsorption capacity from ca. 21-28 to 88-108 mg.g-1 after intercalation. The highest adsorption level was noticed for Telon-Orange dye on the p-MBIM–Bt, presumably due higher interlayer space and better diffusion. The pseudo-first order rate equation was able to provide the best description of adsorption kinetics data for all three dyestuffs. The Langmuir and Freundlich adsorption models were applied to describe the equilibrium isotherms and the isotherm constants were also determined. The results show that MBIM–Bt could be employed as low-cost material for the removal of Telon dyes from effluents.

Keywords : Bentonite, Organoclay, Bisimidazolium, Dyes, Isotherms, Adsorption
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