



Adsorption studies of an azo dye using polyaniline coated calcined layered double hydroxides

Sousna Sahnoun^a, Mokhtar Boutahala^{a,*}, Gisèle Finqueneisel^b, Thierry Zimny^b, Abdelkrim Kahoul^c

^aLaboratoire de Génie des Procédés Chimiques (LGPC), Département de Génie des Procédés, Faculté de Technologie, Université Ferhat Abbas, Sétif-1-19000, Algeria, emails: mboutahala@yahoo.fr (M. Boutahala), ssnsahnoun@yahoo.fr (S. Sahnoun)

^bLaboratoire de Chimie et Physique Approche Multi-échelle des Milieux Complexes (LCPA2MC), 57500 Saint-Avold, France, emails: gisele.finqueneisel@univ-lorraine.fr (G. Finqueneisel), thierry.zimny@univ-lorraine.fr (T. Zimny)

^cLaboratoire d'Energétique et d'Electrochimie du solide (LEES), Département de Génie des Procédés, Faculté de Technologie, Université Ferhat Abbas, Sétif-1, 19000 Sétif, Algérie, email: kahoulabdelkrim@yahoo.fr

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ABSTRACT

In this study, novel composite polyaniline/calcined layered double hydroxides was synthesized through the chemical method using the ammonium persulfate as an oxidant and investigated for its behavior in selective and high adsorption of tartrazine dye from an aqueous solution in a batch system. Scanning electron microscope, Fourier transform infrared spectroscopy, X-ray diffraction, Brunauer–Emmett–Teller method and thermogravimetric analysis were carried out. The effects of solution pH, initial concentration and contact time were investigated. The adsorption processes show that the maximum adsorption capacity of tartrazine was 487.8 mg/g, obtained for the MgAlC-PANI composite and well fitted to Langmuir isotherm model. The adsorption processes followed the pseudo-second-order kinetics model with a very high correlation coefficient of $0.998 < R^2 < 1$. The regeneration studies revealed that the tartrazine loaded MgAlC-PANI could be reused for four consecutive cycles.

Keywords: Polyaniline; Hydrotalcite; Calcination; Composite; Azo dye; Adsorption

* Corresponding author.