

REMOVAL OF SULFACID BRILLIANT PINK FROM AN AQUEOUS STREAM BY ABSORPTION ONTO, SURFACTANT-MODIFIED Ti-PILLARED MONTMORILLONITE

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ABSTRACT

A modified hydrophobic and organophilic pillared clay (CTAC-TiH-montm) was prepared by exchanging *some* Ti polymeric cations into the interlamellar space¹ of one Algenan montmorillonite (montai) and then by co-adsorption of some surfactant molecules such as cetyltrimethylammonium chloride (CTAC). These new materials were used in adsorption of an anionic textile dye: Sulfacid brilliant pink (SAP). According to adsorption isotherms, the organic modification of *Ti*-montmorillonite clay by CTAC surfactant increases the amount of textile dye fixed to more than 1000 mg g⁻¹. The adsorption experiments showed that a ratio of 3 mmol of CTAC per g of clay and an acidic medium (pH = 4) were the optimal parameters necessary to obtain good adsorption uptake and colourless treated solutions. A comparative study proved the high adsorption capacity of the synthesised adsorbents; they can thus be considered as powerful competitors to activated carbon in the treatment of aqueous textile plants and industry effluents

Key words: Modified **clay**, Ti-pillared montmorillonite, adsorption, textile dye.

INTRODUCTION

The contamination of rivers and groundwater by organic pollutants has acted as a stimulus for numerous investigations in various scientific fields e.g. chemistry, agronomy. Many industrial waters and in some cases domestic water supplies are frequently contaminated with organic substances such as phenol, VOCs, pesticides, dyes, etc.

The methods used for the treatment of waters containing these organic pollutants are mainly based on chemical oxidation, flocculation-decantation and adsorption onto activated carbon (AC) in particular. However, one major disadvantage of AC is the loss of small amounts of carbon within each regeneration cycle.

To date, many studies have reported the results of the preparation and characterisation of some inorgano-clays or organo-inorgano-clays prepared initially by intercalation of metallic polycations such as aluminium and iron and their application in adsorption towards some phenolic compounds [1-8] or humic substances [9]. Many other papers deal with decolorization of water and wastewater containing dyes by

various methods [10-15], however there is no information on studies that use organo-inorgano-clays as adsorbent materials.

Sulfacid brilliant pink is the most important of the rosamine category of xanthene dyes. It is used primarily in the dyeing of paper. It may also be used for dyeing silk and wool where bright colours with fluorescent effects are required.

The sportive capacity of natural clays towards neutral organic compounds is limited owing to their hydrophilic nature and the inaccessibility of their internal surface for big organic molecules. The introduction of Al, Fe or Ti polymers followed by surfactant molecules into the interlamellar space of clays offers the possibility of converting the hydrophilic character into organophilic and hydrophobic ones [1-8].

In the case of titanium, it is well known that the Ti^{IV} cation forms a hydroxide precipitate even in a highly acidic medium [4, 16, 17]. The most favourable conditions for preparing polymeric Ti-solution, Ti-pillared clay and CTAC-modified Ti-pillared clay have already been established elsewhere [4].

This paper reports results of adsorption measurements