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ABSTRACTS

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3.A.8. COMPARATIVE ADSORPTION STUDIES OF TWO ANIONIC DYES FROM AQUEOUS SOLUTION USING LAYERED DOUBLE HYDROXIDES

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Layered double hydroxides (LDH) with hydrotalcite-like structure containing Mg(II) and Al(III) in the layers were prepared at different Mg/Al molar ratio by co-precipitation method at constant pH (denoted MgAlLDH). The prepared LDH was used for Alizarin Orange (AO) and Orange G (OG) dyes removal from aqueous solutions. Sorption batch experiments were conducted for optimizing the pH, initial dye concentration, sorbent dose, contact time and temperature. Physicochemical characterization of MgAlLDH before and after sorption studies was carried out by XRD, FTIR, EDX, SEM and BET analysis. The sorption kinetics was analyzed by fitting the data into the following models: pseudo-first-order, pseudo-second-order and intraparticle diffusion. The Langmuir, Freundlich and Dubinin–Radushkevich models were used to fit the adsorption isotherms. The results indicated that Mg/Al layered double hydroxide is an efficient adsorbent for the treatment of wastewater with different concentrations of anionic dyes.

Keywords: MgAlLDH, anionic dyes, adsorption studies, kinetic.

3.A.9. DEVELOPMENT OF POLYMER HYBRID COMPOSITE FILMS WITH TUNABLE WETTABILITY BY SURFACE MODIFICATIONS

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The objective of the present study was to evaluate and compare the wetting behavior of hybrid composite coatings prepared with two different UV initiators for water-repellent applications. The effect of coating chemistry was studied in order to obtain micro hierarchical surface roughness. The coatings were applied in a layer-by-layer configuration: hybrid polymeric matrix as a base layer, followed by nanoparticle dispersion as the top layer. Various polymeric matrices were tested, namely chitosan bearing surface vinyl groups, subsequently cross-linked with ethylene glycol dimethacrylate (EGDMA) using UV initiation at specific wavelengths. (2-Hydroxy-2-methylpropiophenone (HMP) and benzoin methyl ether (BMM) were used as UV initiators for radical polymerization of modified chitosan with EGDMA. The effects of polymer, monomer and initiators concentration and also the solvent volume

used for the polymerization were studied in order to yield coatings with high wetting angle. Also, the influence of the coating structure, that is, the addition of iron oxide nanoparticles capable of magnetic self-assembling during the curing stage and pre-hydrolyzed/precondensed sol–gel solution of hexadecyltrimethoxy silane as a coupling agent, incorporated both into the matrix and the nanoparticle suspension, was evaluated. The magnetite nanoparticles were prepared by mild oxidation of ferrous ions in alkaline solution, followed by amination with (3-aminopropyl) triethoxysilane. Hybrid nanoparticle-polymer films prepared by spraying were deposited and cured by drying on glass slides. The water contact angle measurements evidenced hydrophobic surfaces for the newly prepared hybrid films.

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3.A.10. LAYERED DOUBLE HYDROXIDES AS EFFECTIVE CARRIER FOR THE INTERCALATION OF TRAMADOL HYDROCHLORIDE

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Tramadol hydrochloride (TH) is an opioid pain medication used to treat moderate to moderately severe pain and when taken as an immediate-release oral formulation, the onset of pain relief usually occurs within about an hour. For this reason was intercalated into Zn–Al-layered double hydroxides (ZnAlLDHs) by ion exchange method for controlled drug delivery. LDHs matrix based on Zn(II) and Al(III) at different molar ratios were prepared by co-precipitation method at constant pH, followed by TH solution addition in basic medium for the formation of LDH-drug systems. The samples were characterized by X-ray diffraction (XRD), Fourier transform infrared (FTIR), Raman spectroscopy, thermogravimetric analysis (TG) and scanning electron microscopy (SEM). The analysis confirmed the successful intercalation of TH anions into the interlayer of LDHs. Release of the intercalated TH was studied in simulated gastric fluid (pH = 2) and simulated intestinal fluid (pH = 7.4) at 37 °C. Controlled release of TH from ZnAlLDH/TH was observed. This feature proves that these hybrid materials can be classified as controlled release formulations for the TH under study.

Keywords: layered double hydroxides, tramadol hydrochloride, intercalation, controlled release

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