ABSTRACT BOOK

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Adsorption of Doxorubicin on the surface of magnetically sensitive nanocomposite $Fe_3O_4/Al_2O_3/C$

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Magnetically sensitive nanocomposites with carbon components are promising in the development of new types of carriers for targeted delivery of drugs, contrast agents for magnetic resonance imaging, medical hyperthermia, magnetically controlled adsorbents for various functional purposes.

The aim of this work is to study the adsorption activity of promising for practical use of magnetic-sensitive nanocomposites of the core-shell type based on single-domain magnetite and carbon against the chemotherapeutic drug Doxorubicin (DOX).

A nanocomposite of $Fe_3O_4/Al_2O_3/C$ was synthesized and characterized by a complex of physicochemical methods. According to the results of research: XRD, mass spectrometry, DTA / DTGA, TEM, determination of specific surface area (SSA) and magnetic granulometry the magnetic properties are preserved and a nanocomposite of the core-shell type with a high value of SSA is formed.

The processes of adsorption/desorption, the dependence of adsorption on pH are investigated. DOX adsorption was studied under static conditions (T = 25ºC, g = 0.03g, V = 0.05l, medium 0.9% NaCl, pH = 5 and 7), the required pH values (I-160MI) were established by adding solutions 0.1 N HCl and NaOH. Quantitative parameters of adsorption were calculated by the formula: $A = (C_0\text{-}C_{eq})\cdot V/g$, where C_0 and C_{eq} are the concentration of the initial solution and the equilibrium concentration (mg/l), V – is the volume of the solution (l), g – is the weight of the adsorbent (g). The change in DOX concentrations as a result of adsorption was recorded by spectrophotometric method (UNICO 2100 UV).

According to the results of mathematical processing of kinetic dependences and isotherms, it is established that the adsorption kinetics of DOX corresponds to the pseudo-second order model (A_{exp}= 6.79 mg/g, A_{calc}= 6.96, kg/(mg·min) = = 0.0352, V_0, mg/(g·min) = 1.62, r^2=0,99) with a limiting stage of external diffusion (r^2=0.99) and the isotherm corresponds to the Freundlich model (r^2=0.97).

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