

A STUDY OF THE RELEASE OF ASPIRIN FROM MODIFIED SURFACE OF THE NATURAL CLINOPTILOLITE

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Zeolites as porous materials with well-ordered structures attract a great attention for storage and release of organic guest molecules. In this study, clinoptilolite rich natural zeolite (NZ) from south region of Serbia has been investigated as a carrier for controlled release of aspirin. Immobilization of aspirin on NZ was performed by adsorption. In order to improve the adsorption ability of clinoptilolite, NZ was treated with cationic surfactant benzalkonium chloride (BC). BC was used to modify the NZ surface from partial monolayer to a bilayer coverage. Adsorption of aspirin was performed using 500 and 1000 g ml⁻¹ aspirin solutions. It has been found that the NZ with bilayer BC coverage (NZ-BC) exhibits the highest aspirin uptake. Aspirin delivery from the NZ-BC displays two stages. The first one occurs rather sharply, about 40% within first 15 minutes. Afterwards, the release proceeds more gradually. About 50% of the immobilized aspirin was delivered from the NZ-BC during 6 hours. Release profile indicates that the delivery is controlled by a diffusion process in the first stage, whereas the electrostatic interaction between the carboxylic groups of aspirin and ammonium cations from BC are predominant in the second stage.

Keywords: clinoptilolite, aspirin, controlled release