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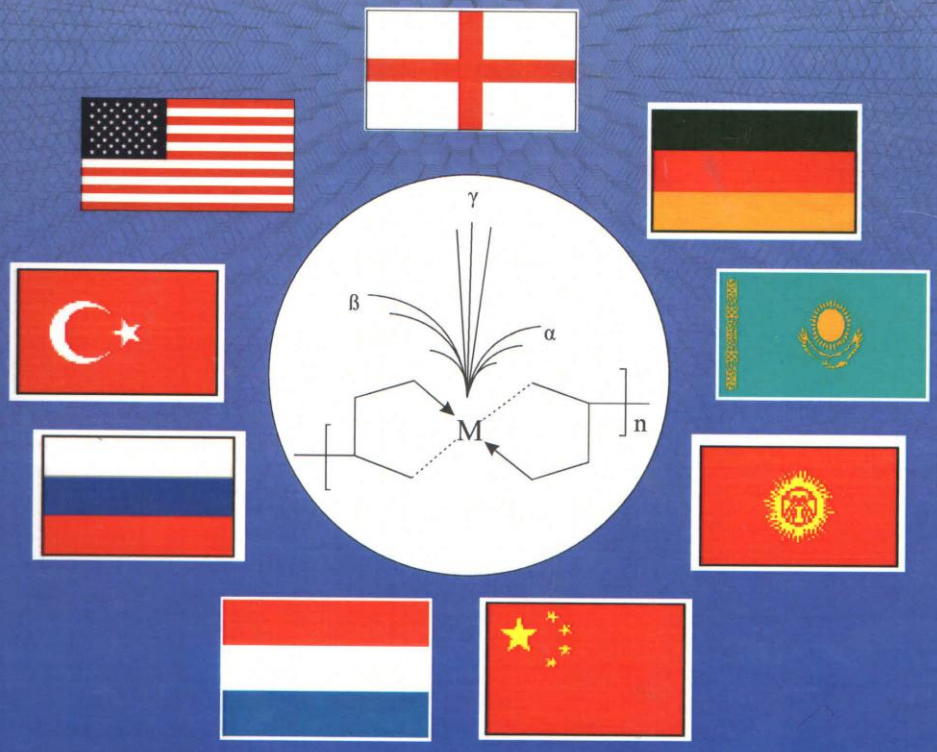

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SWELLING ABILITY OF ACRYLATE-CLAY COMPOSITE GELS IN SOLUTIONS OF SURFACE-ACTIVE SUBSTANCES

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Chemically cross-linked composite gels on the basis of bentonite clay (BC) of the Manrak deposit and poly(carboxylic acids) (PAA and PMAA), nonionic polymers (PHEA and PAAm) were synthesized and their morphology, swelling properties and sorption ability in relation to surfactant molecules were studied. The conformational behavior of composite gels is determined by non-Coulomb forces and depends on the cross-linking degree, clay structure, ionic strength and temperature [1, 2]. The growing interest to polymer-clay composites is due to their improved sorption abilities in comparison with initial components and application as sorbents for sewage treatment from surface-active substances (PEAHENS) and heavy metal ions [2].

In this communication we have studied the swelling and sorption abilities of composite gels with respect to cationic surfactant – cetylpyridinium bromide (CPB). The swelling and sorption parameters of composites gels have shown rather high affinity to the CPB that provides good sorption of PEAHENS. It should be noted that in case of composite gels prepared from PAA (or PMAA) and clay their swelling degree in solutions of CPB is lower than that in water. In case of composite gels based on nonionic polymer PAAm and clay the gel volume in solutions of PEAHENS is considerably higher than that in water. For composite gel PHEA-BC the difference in change of gel volume is insignificant in both water and PEAHENS solutions. These data confirm the considerable role of nature of polymeric matrix in binding of low-molecular-weight substances which in the first case is caused by electrostatic interactions (PAA-BC, PMAA-BC), and in the second case by non-Coulomb forces - hydrogen bonds and hydrophobic interactions (PAAm-BC, PHEA-BC). If the electrostatic interactions of CPB with poly(carboxylic acids) in clay composite lead to contraction of composite gel as a result of charge neutralization, in case of nonionic polymer binding of PEAHENS leads to appearance of uncompensated charges coming from cationic PEAHENS and causes additional swelling. Thermo - and pH-sensitivity of composite gels allows regulating and controlling of sorption ability of a polymeric matrix.

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