

Physico-chemical nanomaterials science

Adsorption of Ag(I) ions onto mono- and bi-functionalized polysiloxanes with magnetic core

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In this work, amine-functionalized polysiloxanes with magnetic core were synthesized according to sol-gel method, described in paper [1]. Four different (two mono- and two bi-functionalized) adsorbents were synthesized and tested as adsorbents for silver ions. In the case of bi-functionalized materials, the second functional groups introducing into their surface, were aliphatic chains.

Adsorption measurements were carried out at the pH=5-9, by using radioisotope method, in 2480 Automatic Gamma Counter (Perkin Elmer, USA). Kinetic of adsorption, influence of pH on adsorption process, as well as changes in the electrical double layer (EDL) at the silica adsorbent / electrolyte solution interface in the presence of silver ions (at different concentration), were examined.

Adsorption measurements have shown, that increasing pH value result in increasing adsorption of Ag(I) ions, achieving maximum at pH≈7.8. Such phenomenon can be explained, that at such pH value amine functional groups, present on the silica surface, are in -NH₂ form, while silver is presented in Ag⁺ ions, thus, electrostatic interactions between adsorbent surface and adsorbate ions can exist.

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1. Melnyk I. V., Gdula K., Dabrowski A., Zub Y. L. Magneto-Sensitive Adsorbents Modified by Functional Nitrogen-Containing Groups // Nanoscale Res Lett.-2016.-DOI 10.1186/s11671-016-1273-4