GOLD AND SILVER NANOPARTICLES MODIFIED BY RECEPTORS FOR ANIONS RECOGNITION

P. ZVATORA1, J. KOKTAN1, L. VEVERKOVA1, T. BRIZA1, V. KRAL1

1 Institute of Chemical Technology Prague, Department of Analytical Chemistry, Prague 6, Czech Republic

Development of receptors which are designed for anion recognition is an important branch of chemistry. The design of synthetic receptors for selective sulfate over phosphate recognition in aqueous media has been a significant challenge. Many of these compounds are not soluble in water. This problem can be solved by immobilization on the nanoparticles surface.

Nanoparticles were prepared by method based on the reduction of noble metals salts by reduction agents. The immobilization of polymethinium salt and two porphyrin-brucine derivatives were carried out by two different ways of ionic interaction. First, direct immobilization of receptor molecules on nanoparticles, second, immobilization of receptor molecules on 3-mercaptopropionic acid premodified nanoparticles. Such prepared nanoparticles were characterized by UV-Vis spectroscopy. This method was used for study of interactions of anions with the modified nanoparticles in water.

Immobilization on nanoparticles, in some cases, prevents the selector molecules from aggregation in water. Various spectral changes were observed in experiments with free versus immobilized selectors in water depending on a type of used system and selected anions. The results showed that type of used nanoparticles have positive or negative affected to stability of these systems in water and have a strong influence on their interactions.

Acknowledgements: The financial support from the Grant Agency of the Czech Republic no. 203/09/1311, the Grant Agency of the Czech Republic no. P303/11/1291, Grant Agency of the Academy of Sciences of the Czech Republic KAN200100801 and Institute of Chemical Technology internal grant A1 FCHI 2012 003 is gratefully acknowledged.

Keywords: Anions; Nanoparticles; UV/Vis spectroscopy;