THE OBTAINING OF COPPER, SILVER AND PALLADIUM NANOPARTICLES FROM AQUEOUS SUPRAMOLECULAR GELS BY VARIOUS WAYS

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Interest in nanostructures is primarily associated with the possibility of obtaining materials with new physical-chemical properties that are different from macrocrystalline ones. The most attractive feature of nanosystems is the ability to regulate the physical response of the material depending on the particle size. Thus, it is obvious that controlling the size, and in many cases even the shapes of particles at the nanoscale, can lead to a change in the properties of well-known materials and open them to applications in new areas. In this work, the obtaining of Cu, Ag, Pd nanoparticles from an aqueous supramolecular gel consisting, presumably, of complexes from metal ions and quercetin was carried out in 3 ways: 1) chemical reduction with sodium borohydride ($NaBH_4$); 2) action by electric alternating current (EAC), 50 Hz, 1 h; 3) the combined effect of $NaBH_4$ and EAC (50 Hz, 1 h).

It has been established that as a result of the interaction of metal ions with quercetin in the aqueous solution a supramolecular gel is formed, while the kinematic viscosity of the solution sharply increases. Further, metal nanoparticles are formed in the result of action to gel by the above-described 3 methods. The formation of metal nanoparticles was determined by laser diffraction on a Nano-S90 laser particle size determinant.

Complexation of quercetin with metal ions was studied at temperatures of 298-313 K (step is 5 K). The stability constants were determined by pH-metric titration according to B'errum at the pH-meter Metrohm pH 827. The background electrolyte was sodium nitrate (I=0.1, 0.25, 0.5, 0.75, 1). It is shown that the size of nanoparticles also depends on the stability of the complexes formed during the interaction of the components of the initial system.

References:

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