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Synthesis of stable silver sols using hydrogen as reductant

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Silver nanoparticles (Ag NPs) attract significant attention due to their unique optical, thermal, electrical properties and antibiotic properties. Reduction of metal ions into neutral clusters is commonly used treatment in chemical NPs synthesis. Ag NPs raises difficulties in developing stable colloidal dispersion, since nanoparticles undergo agglomeration. Therefore, silver colloids stabilized by polymers are investigated to obtain nanosystems with high storage stability. The silver sols for medical application should not content the additives which can be as a tails after chemical reduction.

The present study focuses on the formation and properties of silver sols synthesized by reduction of silver nitrate dispersed in anionic linear and branched polyacrylamide biocompatible polymer matrices [1, 2] using hydrogen as reducing agent to minimize the "tails" after reduction process.

The UV-Vis spectroscopy revealed the formation of silver nanoparticles by exhibiting the typical surface Plasmon absorption maxima. The position and the shape of the absorption bands were depended on the synthesis conditions (pH, temperature) as well as the internal structure of polymer matrices. Transmission electron microscopy was used for analysis of nanoparticles size distribution in silver sols. It was established that branched polymer matrices were more efficient for in situ Ag NPs synthesis and for stabilization of silver sols in comparison with linear ones.

1. *Kutsevol N., Bezugla T., Bezuglyi M., Rawiso M.* Branched Dextran-graft-Polyacrylamide Copolymers as Perspective Materials for Nanotechnology // Macromol. Symp. – 2012. - 317-318.- P.82-90.
2. *Kutsevol N., Bezuglyi M., Bezugla T., Rawiso M.* Star-Like Dextran-graft-(polyacrylamide-co-polyacrylic acid) // Macromol. Symp. – 2014. – 335.- P.12-16.