Electrochemical obtaining of colloidal nanosilver solutions

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This work is a continuation of studies of electrochemical obtaining of colloidal nanosilver solutions, stabilized by sodium polyacrylate.

The synthesis was performed in solutions of $AgNO_3$ in the presence of sodium polyacrylate stabilizer (NaPA). The effect of voltage on the rate of formation of colloidal nanosilver solutions and their coagulation stability has been studied.

It is shown that with increasing of voltage value from 0.6 to 1.5 V (figure) leads to increase the intensity of absorption (D) of obtained colloidal nanosilver solution. Absorption peaks are located at a wavelength of 510 nm.

At the absorption peak of 510 nm, the particle size varies 40...50 nm [1]. The absorption intensity of the colloidal solutions increases (curves 1...3) with increase of the silver nanoparticles size, through the increasing of the plasmon-resonance absorption [2].

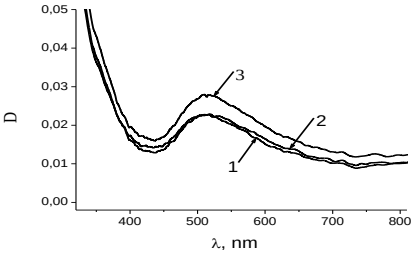

Figure. Absorption spectra of colloidal nanosilver solutions obtained in 0,005 M $AgNO_3$ + 0.05 M NaPA solution at U = 0.6 (1), 1.0 (2), 1.5 V

The optimum conditions for the electrochemical synthesis of colloidal nanosilver solutions with high antibacterial activity and aggregation stability are: voltage value 0.6 V, solution composition 0.005 M $AgNO_3$ + 0.05 M NaPA.

1. *Dubey S., Lahtinen M., Sillanpää M.* Green synthesis and characterizations of silver and gold nanoparticles using leaf extract of Rosa rugosa // J. Colloids and Surfaces A. – 2010. **– 364**, № 6. – P. 34-41.
2. *Wang C., Luconi M., Masi A., Fernőndez L.* Derivatized silver nanoparticles as sensor for ultra-trace nitrate determination based on light scattering phenomenon // Talanta. – . 2009. – **77**, № 3.-. P.1238-1243.