

**TITLE**

**Core-shell colloidal structure of nanobiocomposites of gold nanoparticles capped with natural polysaccharide arabinogalactan**

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In biomedical applications of nanoparticle colloids, design of the nanoparticles colloid morphology is important. Here, we show how the gold content affects the morphology of the nanobiocomposites of gold nanoparticles (AuNPs) with water-soluble branched polysaccharide arabinogalactan, extracted from Siberian Larch. The composites were produced by reduction of gold ions in the alkaline solutions of arabinogalactan, which served both as a nanoreactor and a capping agent for AuNPs. The nanocomposites already proved their antimicrobial activity against gram-positive and gram-negative microorganisms (Aleksandrova G. P. et al. Nanotechniques, 2010). We showed by transmission electron microscopy that two mechanisms influenced the AuNPs formation: (i) the volume of prime spherical AuNPs increased due to the Ostwald ripening; (ii) the rodlike multimers of prime AuNPs were formed due to the oriented attachment. Whereas the AuNP multimers only slightly changed extinction spectra, the scattered light depolarization and dynamic light scattering (DLS) were extremely sensitive to their formation. In particular, the rodlike AuNP multimers strongly depolarized resonantly enhanced scattered light. The depolarization, in turn, invoked additional fast maximum of the relaxation time distributions probed by DLS. Fast and slow modes were attributed to the rotational and translational colloidal diffusion, respectively. The difference between the colloidal and the prime AuNP radii corresponded to the monolayer of capped macromolecules in the colloidal shell. The increase of the colloidal size with gold content was governed by the growth of the gold colloidal core due to both the Ostwald ripening of prime AuNPs and the increase of the mean multimerization degree.

**Biography**

Ekaterina Gasilova has made her PhD in the Institute of Macromolecular Compounds, Russian Academy of Sciences (St.-Petersburg). She had visiting positions in the Research Laboratories of Akzo-Nobel (Arnhem, the Netherlands), University of Le Mans (France), and in the Institut für Makromolekulare Chemie, (Freiburg, Germany). She is a senior research scientist in the Institute of Macromolecular Compounds. She has published 37 articles.