

**Abstract.** Gold nanorods (AuNRs) are successfully employed in drug delivery, biosensors, and biotechnologies. Their wide success is due to their unique chemical properties, biocompatibility, easy, cheap and versatile synthesis. In this framework, AuNRs were synthesized with the aim to obtain strongly hydrophilic nanomaterials, suitable as drug delivery system. AuNRs were synthesized by seed mediated methods in two steps. After careful purification AuNRs were investigated by means of UV-Vis-NIR showing typical surface plasmon resonance (SPR) bands at 550 nm and 970 nm. The Fourier Transform Infrared Spectroscopy (FT-IR) and High-resolution X-ray photoelectron Spectroscopy (HR-XPS) investigations verified the surface functionalization by ascorbic acid (AA) and cetyl trimethyl ammonium bromide (CTAB) and allowed to examine the chemical structure and the interaction between capping agent and metal surface. Moreover, transmission electron microscopy (TEM) observations showed AuNRs with regular shape and size in the range of 20-80 nm. These results point to AuNRs as promising systems for drug delivery applications.