

## Starch-stabilized silver nanoparticles for use in Layer-by-Layerfilms

Rafaela Daiane de Oliveira

State University of Ponta Grossa, Brazil

The nanoparticles of noble metals have attracted interest due to their new size-dependent optical and electronic properties. Stabilization of nanoparticles synthesis is an important stage for homogeneous distribution and size control. The starch has been widely used as a stabilizing agent in 'green'synthesis of silver nanoparticles because is a low-cost polysaccharide. The immobilization of metallic nanoparticles on thin films provides increase of superficial area and, consequently, of conductivity and catalytic efficiency. These characteristics attract interest in the use of thin films with nanoparticles in the surface modification of electrodes for application in electrochemical sensors. The fabrication of these films by the Layer-by-Layer technique stands out for simplicity and low cost. This technique uses the electrostatic interaction between molecules of opposite charges for assembly organized film with nanometer-thick. The objective of this work was the synthesis of silver nanoparticles by chemical reduction and stabilization with starch. The size of nanoparticles was evaluated using Dynamics light scattering and the stability by Zeta potential measurements. These nanoparticles were used as polyanion in the assembly of Layer-by-Layer films, due to negative charge conferred by the reducing agent used, (NaBH<sub>4</sub>). The polycation chosen in this work was 3-n-propylpyridinium-silsesquioxane (SiPy+Cl<sup>-</sup>). The immersion time in the polyelectrolytes was adjusted, as well as pH and concentration. The growth of the films was monitored by UV-Vis spectroscopy and the obtained results showed a higher absorbance with an increase of bilayers number. The relation between the bilayers number and morphological changes in the films was monitored by atomic force microscopy.

### Biography

Rafaela is graduated in Food Technology at Technological University Federal of Paraná, in 2011. She is student of applied chemistry masters at State University of Ponta Grossa. Her main research is nanoparticles synthesis and electrodes modification for development of electrochemical sensors.

[fa\\_rafaela@hotmail.com](mailto:fa_rafaela@hotmail.com)