Preliminary studies of the synthesis of gold nanoribbons based on the seed size

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Nanotechnology and medicine gave birth to the new and promising interdisciplinary research field called nanomedicine. Thanks to the improvements in both of the nanotechnology and nanomedicine we are able to help and improve people's health on the nanoscale. One way is using biosensors that can signalize the existence of pathogens, alien DNA, viruses etc.

The most important features of the nanomaterial to create a biosensor are their shape and stability. Shapes that are the best fit are elongated and flat nanoparticles such as nanotubes, nanorods, nanowires and nanoribbons. The size of these nanocreations gives an opportunity to later functionalize them with biological and chemical molecules.

Gold nanoribbons are promising metallic support for biosensors in the nanoscale, and thanks to the development of modern technology, we are able to create them using various methods. One of them is using oligomeric and polymeric surfactants – surface active agents, built of hydrophobic and hydrophilic moieties that can wrap around the growing nanoparticles. The properties of surfactants are helping to stabilize the growth of the specific shape of nanoparticle such as nanoribbons.

The conducted study has been focused on creation of metallic nanoribbons especially gold nanoribbons with the use of various surfactants. The gold seeds used in the synthesis of nanoribbons have been tested via UV-Vis. Later, properties of synthesized nanoribbons have been tested with Atomic Force Microscopy and Transmission Electron Microscopy. Relying on those spectroscopy and microscopy techniques we were able characterize created nanoparticles.

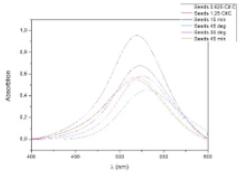

Figure 1 (left). Impact of the temperature, time and concentration of Na3Cit for the growth of nanoribbons.

Factor	Peak [nm]
0,625 ml Na3Cit	516
1,25 ml Na3Cit	513
Time 15 min	520
Time 45 min	520
Temperature 30°C	523
Temperature 45°C	530

Figure 2 (right). Peak value for each factor.

Biography

Joanna Patalas is a student of the 4th year of Medical Physics, Department of Macromolecular Physics, Faculty of Physics, University of Adam Mickiewicz. She and 3 other students under coordination of prof Maciej Kozak has been working on a project that improves ways of obtaining specific shape of nanoparticles with the use of oligomeric and polymeric surfactants. Her passion is working for the improvements in new methods of helping people such as nanomedicne and gene therapy.

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