

Nanoparticle-Imprinted Polymers: Shell-Selective Recognition of Au Nanoparticles by Imprinting Using the Langmuir–Blodgett Method



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The front cover artwork is provided by Prof. Mandler's group at the Hebrew University (Israel). The image shows the reuptake process in which only the particles with the original shell size are captured by the imprinted cavities, while the others are not recognized. Read the full text of the Article at 10.1002/celc.201402407.

What prompted you to investigate this topic?

The wide use of nanoparticles has rapidly increased. Therefore, it is important to develop systems that can recognize nanoparticles based on their structural properties such as their size, shape, or stabilizing shell. We have been working with molecular imprint polymers (MIPs) for a long time and thought that the same concept can be applied to nanomaterials.

What is the most significant result of this study?

We successfully demonstrated the concept of nanoparticle-imprinted polymers (NIPs). The combination of the Langmuir–Blodgett method and electrochemistry has been very successful and allowed the formation of well-defined NIPs and the sensitive detection of the nanoparticles.

What do you consider the exciting developments in the field?

This is a totally new field, which we expect to grow and have a significant impact on the way nanoparticles will be sensed and separated. We were surprised to realize how selective the NIPs are and how well they can be structured. Moreover, with NIPs (as opposed to MIPs) you can actually image the cages very well (by using SEM and other methods).

Does the research open other avenues that you would like to investigate?

The next step is to develop systems that will be able to recognize nanoparticles based on different functionalities in the shell, which affect their nanotoxicity very much. In addition, we would like to develop systems to recognize also nanoparticles from the gaseous phase.

Who designed the cover image?

The cover was designed upon continuous iterations by professional designer Ms. Dalia Tsachi.

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