Optical properties of DNA-hosted silver clusters

Markesevic, N.

Stellingen

Behorend bij het proefschrift

Optical properties of DNA-hosted silver clusters

I

Despite the fact that Ag:DNA clusters are only a few atoms in size, they can support collective, plasmon-like excitations.

This thesis, Chapter 2

II

The polarization of the optical excitation and emission of Ag:DNA indicates that the DNA surrounding of a silver cluster plays a much more important role in the absorption than in the emission of light by Ag:DNA.

This thesis, Chapters 3

III

Heating of the solution of Ag:DNAs formed on DNA tiles and tubes acts as an annealing process in which new emitters are formed through the changes of the silver-DNA structure.

This thesis, Chapter 4

IV

To form stable strings of colloidal particles, DNA tubes can be used as a nano-contact glue between the colloidal particles functionalized with short DNA strands.

This thesis, Chapter 6

V

The low chemical yield in the synthesis of Ag:DNAs and the need of an elaborate purification as described by Schultz et al., is currently the main bottleneck for a wider application of Ag:DNAs.

D. Schultz and E. Gwinn, Chem. Commun., 48, 5748 (2012).

VI

The optical instability of certain silver nanoclusters makes them ideal for the detection of single-nucleotide polymorphism, while optically stable silver nanoclusters are required for fluorescence-resonance-energy-transfer experiments.

J. M. Obliosca et al., Nanoscale, 5, 8443 (2013).; D. Schultz et al., ACS Nano, 7, 9798 (2013).

VII

Conclusions drawn from the nuclear-magnetic-resonance experiments on DNA encapsulated silver clusters by Petty et al. might not be valid for fluorescent Ag:DNAs.

J. T. Petty et al., J. Am. Chem. Soc., 126, 16 (2004).

VIII

The flexibility of DNA, the multiplicity of the possible binding sites, and the presence of positive silver ions and neutral atoms, make the understanding and calculation of the optical properties of Ag:DNAs challenging.

IX

Emotional and social intelligence are better predictors of success in life than the intelligence coefficient (IQ).

Nemanja Markešević
Leiden, December 16, 2015.