

## EuChemS-DAC Study Group / Task Force Annual Report for 2020-2021

**Study Group / Task Force Name: Nanoanalytics**

**Study Group / Task Force Head and Affiliation:**

Prof. Dr. Sergei Shtykov (Head), Saratov State Univ., Russia

**Study Group / Task Force Members and Affiliations:**

Prof. Dr. Pavel Nesterenko, Moscow State Univ., Russia

Prof. Dr. Nikolay Khlebtsov, IBPPM, Russian Acad. of Sci., Russia

Prof. Joao Luis Machado Santos, Univ. Porto, Portugal

Prof. Raluca-Ioana Stefan-van Staden, Nat. Inst. of Res. Electrochem. and Condensed Matter, Romania

**Objectives:** The aim of the Nanoanalytics Task Force is to start a dialog within the analytical chemistry community on the concept of Nanoanalytics. There is however a need to explain in a clear way what Nanoanalytics does, what the outputs of Nanoanalytics are and what the terminology means.

- A concept and definition of Nanoanalytics.
- The most important types and classifications of nanotechnologies used in the chemical analysis.
- The scope of applications of Nanoanalytics in Chemical Analysis.
- Preparation of a textbook and/or manuals for students.

Activities and Outputs in 2020-2021 (e.g. reports, publications, seminars, meetings):

1. **Chapter 2.6 Supramolecular Analytical Chemistry. P.946-950.** In: I S Antipin, M V Alfimov, V V Arslanov, V A Burirov, S Z Vatsadze, Ya Z Voloshin, K P Volcho, V V Gorbachuk, Yu G Gorbunova, S P Gromov, S V Dudkin, S Yu Zaitsev, L Ya Zakharova, M A Ziganshin, A V Zolotukhina, M A Kalinina, E A Karakhanov, R R Kashapov, O I Koifman, A I Kononov, V S Korenev, A L Maksimov, N Zh Mamardashvili, G M Mamardashvili, A G Martynov, A R Mustafina, R I Nugmanov, A S Ovsyannikov, P L Padnya, A S Potapov, S L Selektor, M N Sokolov, S E Solovieva, I I Stoikov, P A Stuzhin, E V Suslov, E N Ushakov, V P Fedin, S V Fedorenko, O A Fedorova, Yu V Fedorov, S N Chvalun, A Yu Tsivadze, **S N Shtykov**, D N Shurpik, M A Shcherbina, L S Yakimova, "Functional supramolecular systems: design and applications", *RUSS CHEM REV*, 2021, **90** (8), 895–1107, DOI: <https://doi.org/10.1070/RCR5011>
2. **N. G. Khlebtsov**, S. V. Zarkov, V. Khanadeev, Y. A. Avetisyan. Novel concept of two-component dielectric function for gold nanostars: theoretical modelling and experimental verification // *Nanoscale*. 2020. Vol. 12. P. 19963–19981. DOI: 10.1039/D0NR02531C.
3. **N.G. Khlebtsov**, E.C. Le Ru. Analytical solutions for the surface and orientation averaged SERS enhancement factor of small plasmonic particles // *J. Raman Spectr.* 2021. V. 52 P. 285-295. doi 10.1002/jrs.5980
4. B. Khlebtsov, D. Bratashov, A. Burov, **N. Khlebtsov**. Tumor Phantom with Incorporated SERS Tags: Detectability in a Turbid Medium // *Photonics* 2021, 8, 144. <https://doi.org/10.3390/photonics8050144>
5. Shtykov Sergei held via Skype 3 meetings in August (2020), November and April to improve the text of the article "Analytical Chemistry of Nanomaterials (Critical evaluation)" for the IUPAC project to the journal "Pure and Applied Chemistry" in September this year.

We did not participate in scientific conferences in connection with covid.

Activities planned for **2021-2022:**

Continued preparation of papers and reviews on the use of nano-objects and nanotechnology in chemical analysis. Publication of the Technical Report "Analytical Chemistry of Nanomaterials (Critical Evaluation) in the journal "Pure and Applied Chemistry".

Preparation of a textbook and/or manuals for students.

The goal of further research is to search for patterns of modification of liquid and solid nanoplateforms to create objects with the required properties.

Participation in international conferences with presentations on the development of nanoanalytics.

Report submitted by: Sergei Shtykov



Date submitted: 01.08.2021