

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

## Study Group / Task Force Members and Affiliations:

Prof. Dr. Sergei Shtykov (Head), Saratov State University, Russia  
 Prof. Dr. Pavel Nesterenko, University of Tasmania, Australia  
 Prof. Dr. Nikolay Khlebtsov, Institute of Biochemistry and Physiology of Plants and Microorganisms, Russian Academy of Sciences, Russia  
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## 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 definition of Nanoanalytics.
- A classification of Nanotechnologies.
- The scope of applications in Analytical Chemistry.


Activities and Outputs in 2016-2017 (e.g. reports, publications, seminars, meetings): **more than 20 paper.**

1. **Monograph** in the stage of edition: Nanoanalytics: Nanoobjects and Nanotechnologies in Analytical Chemistry. Ed. by Shtykov S., De Gruyter, Germany, 12 chapters, 450 p. Feb. **2018**; <https://www.degruyter.com/books/978-3-11-054006-2>
2. **Monograph** Khlebtsov N., Khlebtsov B. Plasmonic SERS Substrates and Probes. LAP Lambert Acad Publ, Saarbrücken. Germany. 2016. 142 p.
3. Nesterenko P.N., Mitev D., Paull B. Elemental analysis of nanodiamonds by inductively coupled plasma spectrometry and related techniques. Chapter 5. pp. 109-130 In: **Monograph** "Nanodiamonds: Advanced Material Analysis, Properties and Applications". Ed. by Arnault J.C., Elsevier Inc. **2017**. ISBN: 9780323430296
4. Approval of **IUPAC project** entitled "Analytical Chemistry of nanomaterials - Critical Evaluation" (# **2017-005-3-500**) **Task Group Chair:** Prof. Jan Labuda. **Task Group Members:** Prof. S.N. Shtykov, Prof. G. Gauglitz et al.
5. Gorbachev I.A., Shtykov S.N., Brezesinski G., Glukhovskoy E.G. Studying of quantum dots Langmuir monolayers stability at the different subphase temperature. *BioNanoSci.* **2017**. DOI 10.1007/s12668-017-0404-4
6. Matczuk M, Legat J., Shtykov S.N., Maciej Jarosz M., Timerbaev A.R. Characterization of the protein corona of gold nanoparticles by an advanced treatment of CE-ICP-MS data. *Electrophoresis.* **2016**. V. 37. № 15-16. P.2257-2259.
7. Matteini P., Cottat M., Tavanti F., Panfilova E., Scuderi M., Nicotra G., Menziani M.C., **Khlebtsov N.**, de Angelis M., Pini R. Site-Selective Surface-Enhanced Raman Detection of Proteins. *ACS Nano* **2017**, 11, 918–926.
8. Vanza E., Pylaev T., Khanadeev V., Konnova S., Fedorova V., **Khlebtsov N.** Gold nanoparticle-assisted polymerase chain reaction: effects of surface ligands, nanoparticle shape and material. *RSC Adv.*, **2016**, 6, 110146–110154.
9. Sofia S., Rodrigues M., Ribeiro D.S.M., Soares J.X., Passos M.L.C., Saraiva M.L.M.F.S., **Santos J.L.M.** Application of nanocrystalline CdTe quantum dots in chemical analysis: Implementation of chemo-sensing schemes based on analyte-triggered photoluminescence modulation; *Coord. Chem. Revs* **2017**, 330, 127–143.
10. Lanin S., Rychkova S., Vinogradov A., Lanina K., Obrezkov O., **Nesterenko P.** Changes in adsorption properties of detonation nanodiamond after treatment with acids and bases. *Adsorption.* **2017**. V.23. P.639-650.
11. Peristy A., Paull B., **Nesterenko P.N.** Adsorption of inorganic ions by microdispersed sintered detonation nanodiamonds. *Adsorption.* **2016**. V.22. No.7. P.373-381.
12. Gugoasa L.A., Al'Ogaidi A.J.M., **Stefan-van Staden R.I.**, El-Khatib A., Rosu M.C., Pruneanu S. Multimode microsensors based on Ag-TiO<sub>2</sub>-graphene materials used for the molecular recognition of carcinoembryonic antigen in whole blood samples. *RSC Advances*, **2017**, 7, 28419 - 28426,

**Conferences:** 1. **Shtykov S.N** et al. Magnetic core-shell nanomaterials: properties, modification and application. XVI-th Intern. Seminar on Inclusion Compounds (June 26-30, **2017**, Kazan, Russia), oral;

2. **Shtykov S.N** et al. Magnetic solid phase extraction based on magnetite nanoparticles in chemical analysis. XX Mendeleev Congr on General and Applied Chem. 26-30 Sept. **2016**. Ekaterinburg, Russia, **oral**
3. **Shtykov S.N.** Nanoanalytics: current status and perspectives. Euroanalysis XIX, Stockholm, 2017, oral
4. **Nesterenko P.N.**, et al. Properties and chromatographic performance of diamond based phases. 31<sup>st</sup> Intern Symp on Chromatogr, ISC2016. 28<sup>th</sup> Aug-1<sup>st</sup> Sept **2016**, Cork, Ireland, oral. **Total:** more than **6** lectures.

## Activities planned for 2017-2018:

- A definition of Nanoanalytics. 
- A classification of Nanotechnologies involved in Nanoanalytics.
- The scope of applications in Analytical Chemistry.
- Preparation a topical collection devoted "Nanoanalytics in "Analytical Bioanalytical Chemistry" Journal.
- Critical evaluation and discussing the state-of-the-art and international activities in the Nanoanalytics.

Report submitted by: Sergei Shtykov

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