EuChemS-DAC Study Group / Task Force Annual Report for 2019-2020

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

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

Prof. Dr. Sergei Shtykov (Head), Saratov State Univ., Russia
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 2019-2020 (e.g. reports, publications, seminars, meetings):

1. **Nikolai G. Khlebtsov**, Li Lin, Boris N. Khlebtsov, Jian Ye. Gap-enhanced Raman tags: fabrication, optical properties, and theranostic applications // Theranostics. 2020. V. 10, No. 5. P. 2067-2094. doi: 10.7150/thno.39968.
2. Boris N. Khlebtsov, Roman S. Tumskiy, Andrey M. Burov, Timofey E. Pylaev, **Nikolai G. Khlebtsov**. Quantifying the numbers of gold nanoparticles in the test zone of lateral flow immunoassay strips // *ACS Applied Nano Mater*. 2019. Vol. 2, No. 8. P. 5020-5028. https://doi.org/10.1021/acsanm.9b00956
3. Ana M. Piloto, David S.M. Ribeiro, S. Sofia M. Rodrigues, **João L.M. Santos**, Maria G.F. Sales Label-free quantum dot conjugates for human protein IL-2 based on molecularly imprinted polymers. *Sensors and Actuators B-Chemical*, 304 (2020), article 12734.
4. José X. Soares; K.D. Wegner; David S.M. Ribeiro; Armindo Melo, A; Inês Hausler; **João L.M. Santos**, Ute Resch-Genger Rationally designed synthesis of bright AgInS2/ZnS quantum dots with emission control. *Nano Research*, Jun 2020. DOI: 10.1007/s12274-020-2876-8
5. Rafael C. Castro; David S. M. Ribeiro; Ricardo N. M. J. Páscoa; Jose X. Soares; Sarmento J. Mazivila**; João L. M. Santos.** Dual-emission CdTe/AgInS2 photoluminescence probe coupled to neural network data processing for the simultaneous determination of folic acid and iron (II). *Anal. Chim. Acta*, 1114 (2020) 29-41.
6. Rafael R. Castro, José X. Soares, David S.M. Ribeiro, **João L.M. Santos.** Dual-emission ratiometric probe combining carbon dots and CdTe quantum dots for fluorometric and visual determination of H2O2. *Sensors and Actuators B-Chemical*, 296 (2019), article 1266665.
7. Lanin S.N., Platonova S.A., Lanina K.S., Vinogradov A.E., Nesterenko E.P., **Nesterenko P.N.** Sorption concentration of water-soluble vitamins on sorbents of various nature. *Adsorption.* 2020. V.26. P.339-348. doi.org/10.1007/s10450-019-00186-3
8. Egunova O.R., Reshetnikova I.S., Kazimirova K.O., **Shtykov S.N**. Magnetic Solid-Phase Extraction and Fluorimetric Determination of Some Fluoroquinolones. J. Anal Chem. 2020. Vol. 75. No.1. P. 24-33. https://doi.org/10.1134/S1061934820010062
9. Maria Coro, Stela Pruneanu, **Raluca-Ioana Stefan-van Staden**. Review—Recent Progress in the Graphene-Based Electrochemical Sensors and Biosensors. January 2020 J. Electrochem. Soc. 2020 167(3). 037528. DOI: 10.1149/2.0282003JES
10. Raluca-Ioana Stefan-van Staden Alexandrina Moscalu-Lungu, Jacobus Frederick van Staden. Determination of β-carotene in soft drinks using a stochastic sensor based on a graphene–porphyrin composite. lectrochem. Commun. 2019. 109:106581 DOI: 10.1016/j.elecom.2019.106581
11. **Analytical chemistry**. In 3 volumes. Vol. 3. Instrumental analysis methods. Part 2 / Ed. Prof. A.A. Ishchenko. Moscow. FIZMATLIT, 2020. 540 p., which contains **Chapter 2 "Nanoanalytics", (by SN Shtykov) pp. 96-128**) (in Russian).

Activities planned for 2020-2021:

Continued preparation of papers and reviews on the use of nano-objects and nanotechnology in chemical analysis. Critical assessment of the methods necessary for the analysis and characterization of nano-objects those are important for analysis.
Preparation of a textbook and/or manuals for students.

Report submitted by: Sergei Shtykov 

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