

Application of Metallic Nanoparticles in LDI MS and Mass Spectrometry Imaging

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In the last years metallic nanoparticles, especially gold nanoparticles have attracted the attention of researchers due to their unique properties. Among the various metal nanoparticles, gold nanoparticles are the most frequently applied in LDI-MS. The advantages of using gold nanoparticles in laser desorption/ionization mass spectrometry (LDI MS) are primarily the simplicity of synthesis and modification/functionalization of AuNPs surfaces, high chemical stability and high UV absorption coefficient.

One of the most important objective of the project PRELUDIUM research is the development of new method for deposition of metallic nanoparticles onto steel target. Our research group focus on methods of preparing steel surfaces and synthesis of metallic, bimetallic and polymetallic nanoparticles. We also study of the potential and limitations of using AuNPET method in laser desorption/ionisation for the analysis of ionic and non-ionic compounds of different chemical properties.

One of the main directions of LDI-MS's development is the imaging mass spectrometry (MSI), enabling the visualization of surface distribution of biological samples. Our research focused on possibility of using AuNPET method in imaging of objects of biological origin. In addition, our research group analysis of a fingerprint on the steel target coated with metallic nanoparticles in order to identify and localize the endogenous and exogenous substances was described.

Biography:

Justyna Sekuła received the M.Sc. degree in Biotechnology (specialization – industrial biotechnology) at Warsaw University of Technology (Poland) in 2013. She received Ph.D. title in 2017 after defending her work entitled "New matrix free system to laser mass spectrometry" at Rzeszow University of Technology (Poland). She is manager of the project PRELUDIUM financed by the National Science Centre. Her research is focused on the novel matrix-less systems used for laser desorption/ionization mass spectrometry and mass spectrometry imaging.