Abstract

Modifications of the PAMONO-Sensor Help to Size and Quantify Low Number of Individual Biological and Non-Biological Nano-Particles †

Rahat Morad Talukder, Al Shahriar Hossain Rakib, Julija Skolnik, Zohair Usfoor, Katharina Kaufmann, Roland Hergenröder and Victoria Shpacovitch *

Leibniz Institut für Analytische Wissenschaften-ISAS-e.V.; Bunsen-Kirchhoff-Straße 11, 44139 Dortmund, Germany; rahat.talukder@isas.de (R.M.T.); hossain.rakib@isas.de (A.S.H.R.); Julija.Skolnik@isas.de (J.S.); zohair.usfoor@isas.de (Z.U.); katharina2.kaufmann@tu-dortmund.de (K.K.); roland.hergenroeder@isas.de (R.H.)
* Correspondence: victoria.shpacovitch@isas.de or vshpacov@gmx.de
† Presented at the 8th International Symposium on Sensor Science, 17–28 May 2021; Available online: https://i3s2021dresden.sciforum.net/.

Abstract: In a series of recently published works, we demonstrated that the plasmon-assisted microscopy of nano-objects (PAMONO) technique can be successfully employed for the sizing and quantification of single viruses, virus-like particles, microvesicles and charged non-biological particles. This approach enables label-free, but specific detection of biological nano-vesicles. Hence, the sensor, which was built up utilizing plasmon-assisted microscopy, possesses relative versatility and it can be used as a platform for cell-based assays. However, one of the challenging tasks for such a sensor was the ability to reach a homogeneous illumination of the whole surface of the gold sensor slide. Moreover, in order to enable the detection of even relatively low concentrations of nano-particles, the focused image area had to be expanded. Both tasks were solved via modifications of previously described PAMONO-sensor set ups. Taken together, our latest findings can help to develop a research and diagnostic platform based on the principles of the surface plasmon resonance (SPR)-assisted microscopy of nano-objects.

Keywords: surface plasmon resonance; virus-like particles; extracellular vesicles; liquid biopsies


Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: The data presented in this study are available on request from the corresponding author.