

Nanotechnology molecular tagging

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A novel technology of measuring concentrations of ionized molecules in gases that enables detection of individual ionized molecules by means of tagging them with readily detectable nano-objects has been discovered, developed and partially commercialised. It was found that Nanotechnology Molecular Tagging (NMT) method where ions were tagged with electrically neutral objects, e.g. nanoparticles with radius 100 nm, can provide a breakthrough in sensitivity by enabling a single molecular ion, electron or muon to be detected. This provides an increase in sensitivity over three orders of magnitude in comparison to existing detection methods based on the Faraday cup/plate or Mass Spectrometry. For example, the concentration of ionized molecules of cocaine was measured and a detection limit of 5 cm⁻³ was observed. This concept opens doors for advances in detection sensitivity in chemistry, biology, medicine and physics. In medical applications and life science the measurement of VOC biomarkers as a diagnostic of cancer and infectious diseases is a rapidly growing area of metabolomics that promises to bring a non-invasive

fast diagnostic to points of care. An increase in sensitivity with NMT detector will enable diagnosis of earlier stages of diseases and increase patient survival rate, e.g. for the lung cancer from 20 to 80%. Detection of an ultra-low concentration of VOCs is crucial for security applications to identify explosives and illicit drugs in airports. Replacement of Faraday cup sensors with NMT detectors enables the false negative rate of detection to be considerably reduced and also it improves customer experience.

Speaker Biography

Boris Gorbunov has been working in nanotechnology over 40 years. He has worked in the UK, Finland, Russia and France. Currently he is a director of Ancon Technologies Ltd. (Canterbury UK), Ancon Medical Inc. (Minneapolis MN), Naneum Ltd., (Canterbury UK) and a Board Member of some other nanotechnology companies. He has over 150 publications and circa 600 citations. His RG score is 33.75. He is an inventor of the NMT detection technology and the main driving force to commercialize and apply it for the life science and medical diagnostic. He also has developed a new method and instrumentation to evaluate adverse health effects of airborne nanoparticles. He is a co-author of discovery of the surface controlled nucleation that was successfully applied to characterise carcinogenic potential of nanoparticles.

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