USF Available Technologies

Technology Transfer Office

Carbon Nanotube Anchor for Mass Spectrometer

Researchers at the University of South Florida have developed method to increase the reproducibility and sensitivity of Matrix Assisted Laser Desorption Ionization Mass Spectrometry (MALDI-MS) measurements.

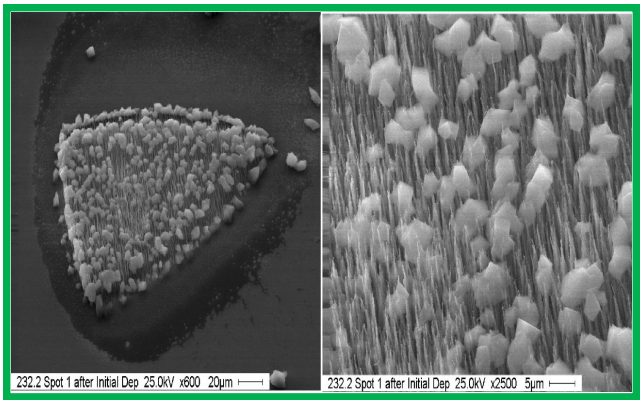
MALDI-MS is a technique used for the quantification and detection of bio-molecules and other macro-molecular substances for applications ranging from proteomics and cancer early detection to forensic investigations. One of the major drawbacks of existing MALDI-MS equipment is that the laser spot can interrogate only a small fraction of the deposit and the mass spectrometer never analyzes most of the analyte. This limits the total achievable sensitivity. Hence, there is a need for device that has enhanced sensitivity for the detection of molecular compounds.

Researchers at USF have developed a technology that aims at increasing the reproducibility and sensitivity of MALDI-MS for water-insoluble matrix based samples through improving the sample preparation process. The invention introduces an additional feature to the anchor spot called nucleation enhancement via nanotubes. These nanotubes act as anchor surfaces for the water-insoluble matrix solution and concentrate a droplet to a specific position on a MALDI-MS sample plate. The nanotube spots show consistently better performance than the standard plate controlled samples. The enhancement may be achieved with other materials, such as semiconductor or insulator nanowires, or micro-machined/lithographically patterned three dimensional surface structures.

ADVANTAGES:

- **Increases reproducibility**
- **Increases sensitivity**
- **Improves the sample preparation process**
- **Enhancement in the detection of molecular compounds**

Carbon Nanotube Anchor Spots Enhance Measurement Sensitivity



Scanning Electron Microscopy Images of the Carbon Nanotube Patch Used as Anchor Spot

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