

Polymer matrices for ambient ionization mass spectrometry

Researchers in Prof. Richard Zare's laboratory have developed a low-cost, thin, flexible, reusable polymer matrix to be utilized as an ionization vehicle for ambient mass spectrometry. These organosiloxane materials contain reactive groups on their surfaces and can be used to directly analyze crude samples in the ambient atmospheric pressure of the laboratory. The properties of the sol-gel-based polymers can be controlled by varying the reaction conditions to customize their porosity, flexibility and transparency for specific applications. Also, they can be modified and functionalized with organic molecules through a low-temperature process to create a “bioactive” surface. The matrices can be used in mass spectrometry for sensitive analyte detection with a range of biological, chemical, diagnostic or environmental sensing applications.

Applications

- **Mass spectrometry** - replacement for paper as ionization vehicle for ambient mass spectrometry, with end user applications in:
 - biochemical and chemical research
 - diagnostics
 - environmental sensing

Advantages

- **Easy, low-cost fabrication** - facile and controllable by varying reaction conditions
- Polymers can be **functionalized** with reactive groups on the surface
- Polymer spray is **superior** to paper spray:

- can spray hydrophilic drugs and biomarkers at low concentrations that are medically relevant
- can open many systems for study that are previously impossible by many other analytical techniques
- **Thin, flexible, porous, transparent** material – polymers are less than 1mm thick and can be easily cut with scissors into a variety of shapes
- **Reusable** - can be used more than 5 times with stable spray signal
- Capacity for **filtration and separation** of microscopic components, such as cells
- **Wicks fluid** through capillary action
- **Castable**

Publications

- U.S. Published Patent Application 20150037828, ["METAL ORGANIC POLYMER MATRICES AND SYSTEMS FOR CHEMICAL AND BIOCHEMICAL MASS SPECTROMETRY AND METHODS OF USE THEREOF"](#).

Patents

- Published Application: [20150037828](#)

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