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Low Temperature Plasma (LTP) Probe

A low-temperature plasma probe enables direct, high-speed chemical analysis of solids and liquids by generating gas-phase ions for mass spectrometry.

Desorption ionization methods are extremely valuable in chemical analysis using mass spectrometry due to their capabilities of generating gas phase analyte ions directly from samples in the condensed phase. Recently developed desorption ionization methods include methods in which the sample is present in the open atmosphere, such as desorption electrospray ionization (DESI), direct analysis in real time (DART), atmospheric pressure dielectric barrier discharge ionization (DBDI), electrospray-assisted laser desorption/ionization (ELDI), and atmospheric-pressure solids analysis probe (ASAP). Some of these methods use active species generated in plasmas for chemical desorption. The gas phase ions formed from the analyte by the active species generated by the low temperature plasma are subsequently mass analyzed by a mass spectrometer.

Purdue University researchers have developed a direct current (DC) discharge plasma sustainable with helium at atmospheric pressure for desorption ionization of solids and liquids. An alternating current (AC) direct discharge plasma source has been used for chemical analysis. A plasma pen using pulsed DC has also been developed. In the low temperature plasma probe, a dielectric barrier discharge is used as the plasma source and active species are extracted from the plasma while it is scanned across a surface of interest; at the surface, these active species generate gas phase ions of surface constituents for mass spectrometric analysis.

Advantages:

-Works with a mini mass spectrometer

-Allows for direct analysis of sample

Potential Applications:

-Chemical analysis

TRL: 6

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Category
Materials Science & Nanotechnology/Materials Testing & Characterization Tools
Biotechnology & Life Sciences/Analytical & Diagnostic Instrumentation

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Provisional-Patent, 2008-02-12, United States | NATL-Patent, 2009-02-11, European Patent | NATL-Patent, 2009-02-11, China | PCT-Patent, 2009-02-11, WO | EP-Patent, 2009-02-11, United Kingdom | EP-Patent, 2009-02-11, France | EP-Patent, 2009-02-11, Germany | NATL-Patent, 2010-07-21, United States | CON-Patent, 2013-05-14, United States | CON-Patent, 2013-08-26, United States

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