

Laser Ablation Glow Discharge Time-of-Flight mass Spectrometry (LAGD-TOFMS) for spectrochemical imaging.

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A laser sampling technique has been reported which combines laser ablation (LA) with a pulsed glow discharge (GD) and a time-of-flight mass spectrometer (TOFMS). The major advantages of this technique are, besides the improved spatial resolution compared to GDMS, the improved sensitivity of the analyte when ablating the material directly in the pulsed GD, and the ability to provide quasi simultaneous elemental and molecular information of organic material. These investigations have covered both inorganic and organic samples. For the inorganic samples some figures of merit will be presented showing an increased sensitivity when using the post-ionization of the pulsed GD compared to LA alone. Regarding the organic samples, results will be presented showing that the extent of fragmentation of molecular ions can be controlled with this approach: a hard ionisation in the powered phase of the discharge results in a stronger fragmentation of the analyte introduced into the gas phase, whereas a softer ionization in the afterglow promotes the formation of the higher mass parent molecular ion.

The ability to identify the molecular origin of elements (speciation) in mass spectroscopy is of great interest and has immediate applications in biochemistry.