

Miniaturized plasmas for analytical spectrometry

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The aim of several research institutes is to develop powerful and robust miniaturized plasmas, which can be integrated on a chip because plasmas in combination with separation techniques are widely used in analytical sciences. The advantage of a miniaturized plasma in lab-on-a-chip systems would be a further improvement in the compactness of the total analytical system, which allows its application outside of the laboratory. Furthermore, parallel and high-throughput measurements can be performed if many systems are used simultaneously.

The dielectric barrier discharge (DBD) and the hollow cathode-type micro-structured electrode discharge (MSED) [1,2] are both plasmas, which are suitable for integration in mass-produced, miniaturized analytical instruments. When these plasmas are coupled with laser spectrometry (DBD) applying small size laser diodes, or optical emission and mass spectrometry (MSED) using miniaturized optical and mass spectrometers, they can be applied as detectors. Both μ -plasmas are sufficiently robust for GC-detection if they are operated with a noble gas. The analytical figures of merit are comparable to plasmas of much larger size if they are applied together with the respective spectroscopic techniques mentioned above.

1. M. Miclea, K. Kunze, J. Franzke, K. Niemax, *Spectrochim. Acta, Part B* 57 (2002) 1585.
2. J. Franzke, K. Kunze, M. Miclea, K. Niemax, *J. Anal. At. Spectrom.* 18 (2003) 802.