

LASER ABLATION CELL FOR HIGH-RESOLUTION IMAGING MASS SPECTROMETRY

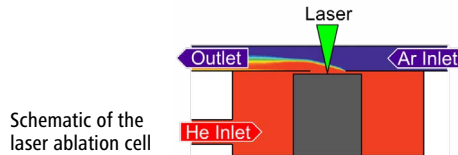
Problem – Challenge

Laser ablation cells are most commonly used for high-throughput measurements in mass spectrometry. Each laser shot produces a small volume of aerosol from a solid sample. Then, the aerosol is transported quickly to the spectrometer in order to a) clear the ablation cell for the next laser shot and b) avoid dispersion of the sample, which would result in a signal reduction. The quick transport of the ablated aerosol is challenging as turbulences in the carrier gas flow have to be avoided.

Solution

The laser ablation cell has a simple and yet very effective design (fig. 1), which is optimised for a fast washout of the sample and a laminar flow of the carrier gas. The ablation cell is attached underneath the flow tube to the spectrometer. It is flushed with helium, which rises and joins the carrier gas argon.

The concept has proven very powerful and its aspects were incorporated into the Hyperion™ Imaging System by Fluidigm® Inc., a global company which develops and markets bioanalytical instrumentation. The Hyperion system is used to study cell biology, e.g. cancer tissue. The samples are stained with a mix of metal isotope tagged antibodies. The laser evaporates the tissue spot by spot and the metal isotopes appear in the mass spectrum. Thus, the cytometry can be mapped with micrometer resolution.



Hyperion Imaging System by Fluidigm

