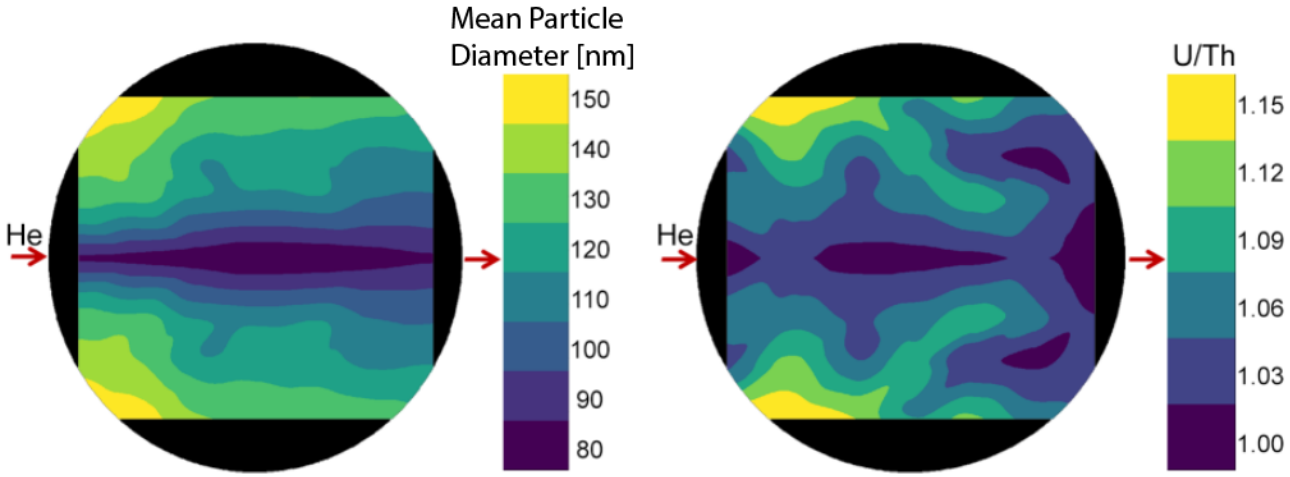
# Impact of ablation cell design in LA-ICP-MS quantification

Pascal Becker, Joachim Koch, Detlef Günther

Laboratory of Inorganic Chemistry, ETH Zürich, Vladimir-Prelog-Weg 1, CH-8093 Zürich, Switzerland
beckerpa@inorg.chem.ethz.ch

Laser ablation inductively coupled plasma mass spectrometry (LA-ICP-MS) has been used routinely in the past few decades for the analysis of samples in geology, biology, material sciences, forensics and more. Large volume ablation cells are predominantly used, which mix the laser generated aerosols in a large volume and allow for the acquisition of stable signals for applications such as isotope or bulk analysis. For purposes that require spatial information, such as imaging and depth profiling, low dispersion laser ablation cells have been developed to resolve individual laser pulses. These cells commonly use a two volume approach, where samples are placed on a 3D-stage within a large volume, below a much smaller volume with a narrow opening in-between.[1,2]

In this work, the differences of the aerosol transport between these two types of ablation cells were investigated in terms of quantification accuracy. Transport phenomena of the laser generated aerosols were studied based on their particle size distributions and elemental ratios. The differences between low and high dispersion were investigated, as well as the effect of further aerosol stretching after the low dispersion ablation cell and the three setups were compared in regards to reproducibility and accuracy.




[1] A. Gundlach-Graham, D. Günther, *Anal. Bioanal. Chem.* **2016**, 408, 2687–2695.
[2] S.J.M. Van Malderen, J.T. Van Elteren, F. Vanhaecke, *J. Anal. At. Spectrom.* **2015**, 30, 119–125.
[3] C. Neff, P. Becker, D. Gunther, *J. Anal. At. Spectrom.* **2022**, *Advance Article*