Improving Accuracy and Precision for LA-ICP-MS with Gas Humidification

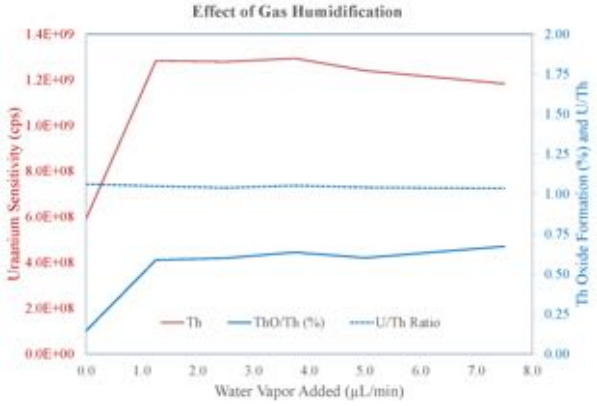
J.C SAKOWSKI[1], J.KRAHAN[1], C. O'CONNOR[2] AND M.P. FIELD[1]

[1]Elemental Scientific Incorporated, Omaha, NE, USA. (jsakowski@icpms.com, jkrahan@icpms.com, field@icpms.com)

[2]Elemental Scientific Lasers, Bozeman, MT, USA. (coconnor@icpms.com)

Elemental mass bias observed during Laser Ablation Inductively Couple Mass Spectrometry (LA-ICPMS) is attributed to three primary sources; 1) in the laser cell during ablation, 2) in the plasma during ionization and 3) in the mass spectrometer during ion extraction and transmission. The third is due to preferential ion transmision, however, 1 and 2 are a result of the ablation process and dry plasma conditions, respectively. Here we investigate gas humidification as a method for reducing mass bias, thereby improving accuracy and precision of results.

Syringe injection with desolvation (micro*FAST*-apex2 combination) is used precisely control water vapor addition to a NWR193 excimer aerosol stream. The setup is tuned for minimal mass bias by adjusting the U/Th ratio to 1 in NIST 610. Vapor addition from 1 to 10µLmin^{-1} illustrate significant improvements in sensitivity with only slight increase in oxide formation.



Optimal water vapor addition conditions of 1 µLmin^{-1} are used to evaluate trace metal quantification using LA-ICPMS. We compare trace metal results for reference materials over a wide range of matracies.