

# **Isotope Ratio Measurements for Sample Dating Studies Using Multicollector ICP-MS and Signal Enhancement via a Desolvating Nebulizer Accessory with Nitrogen Gas Addition**

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## **Abstract**

Multicollector ICP-MS instruments are widely used in geochemistry for high precision isotope ratio measurements. Isotope signal enhancement and/or mass spectral interference reduction (ex. oxides and hydrides from injected water) is often necessary for useful measurement of low abundant isotopes and mass-limited samples.

This work will describe the setup, optimization, and use of an advanced desolvating nebulizer accessory for multicollector ICP-MS. Important accessory benefits include a low-flow self-aspirating concentric nebulizer with inert flow path, a heated inert spray chamber and membrane desolvator with adjustable temperatures for optimum sample transport efficiency, and dedicated mass flow controllers with computer software control for Ar sweep and N<sub>2</sub> addition gases for ease of tuning in the host multicollector ICP-MS software.

The desolvating nebulizer accessory is especially applicable with multicollector ICP-MS for uranium-thorium dating, as is commonly used for dating travertine, speleothem, marine coral calcite, and aragonite samples. System setup parameters and dating measurements will be presented for representative sample types.