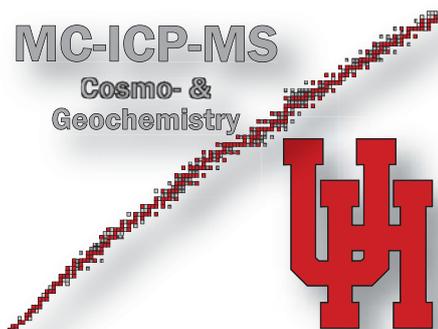


Multi-Collector Inductively Coupled Plasma & Laser Ablation Mass Spectrometer Lab University of Houston



Lab Description: The Multi-Collector Inductively Coupled Plasma and Laser Ablation Mass

Spectrometer laboratory at the University of Houston is equipped with Nu Plasma II multi-collector ICP, and Varian 810 quadrupole ICP mass spectrometers; and Cetac Aridus II desolvating nebulizer, and Photon Machines Analyte.193 laser for sample introduction of solution and laser ablated samples respectively. The lab is capable analyzing a wide range of geochronologic isotope systems with focus on samarium-neodymium and lutetium-hafnium dating of igneous and metamorphic rocks and in situ uranium-thorium-lead dating of minerals including zircon, apatite, baddeleyite, and monazite.

A combined four step chemical separation for Sm-Nd and Lu-Hf make it possible to analyze both systems on the same sample. If only Sm-Nd analyses are desired a simpler two stage separation can be applied. With sufficient spread in parent-daughter ratios, precise Sm-Nd and Lu-Hf ages has been determined in the UH lab for samples with ages from 1 to 4557 Ma.

For in situ U-Th-Pb dating by LA-ICP-MS, spot sizes of 5 μm or greater can be used. We routinely analyze samples in polished thin sections, in polished grain mounts, or on whole grains (for depth profiling). Because the samples are analyzed by quadrupole ICP-MS, we can also determine the concentrations of many trace elements during the U-Th-Pb analysis without split-streaming.

Timeframe: Depending on the nature of the project and how much preliminary work has been completed before arrival visiting students should plan on spending 1 to 2 weeks in the lab at UH. For Sm-Nd and Lu-Hf work samples will be spiked and dissolved and Sm-Nd and Lu-Hf will be separated through column chemistry before analysis on the mass spectrometer. Depending on the nature of the samples, dissolution could be very time consuming and could be done by lab staff prior to the arrival of the visiting student. For in situ analyses, samples can be prepared and analyzed (including CL imaging) within a week.

Analytical Costs: For Sm-Nd and Lu-Hf analyses, visiting students should budget \$500 per analysis of Sm-Nd and Lu-Hf, or \$400 if only one of the systems will be analyzed. For in situ U-Pb analyses, students should budget about \$500 per detrital zircon sample (120 spot analysis plus standards) or \$76/hour of instrument time. These prices include all consumables and supplies, use of equipment, and training. Students are encouraged to contact the lab to discuss analytical plans so a detailed budget can be made.

Preparations for visit: Visiting students should arrive at University of Houston with pure mineral separates and an estimate of trace element concentration for optimal spiking for Sm-

Nd and Lu-Hf chronology. For in situ U-Th-Pb dating visitors should arrive with mineral separates for mounting. Students who do not have access to mineral separation facilities can either contact commercial mineral separation labs, or perform the mineral separations themselves at UH. Time and cost of mineral separation are not included in the above estimates and should be discussed with lab personnel.

Data processing and interpretation: While in the lab, visiting students will be learn how to process and reduce all of the data they have collected. This includes calculation of isotopic ratios and ages, trace element concentrations, data reproducibility, and the propagation of uncertainties. Lab staff will continue to be available to consult with the students through email and/or phone until the visiting students are satisfied that they understand the results.

Laboratory staff: The Multi-Collector Inductively Coupled Plasma and Laser Ablation Mass Spectrometry laboratory at the University of Houston is directed by Tom Lapen and managed by Rasmus Andreasen. The associated clean room laboratory is managed by Minako Righter. Visiting students will, depending on the nature of their project, work with all or some of laboratory staff, who will provide training and assist with sample preparation, analysis, and data reduction and interpretation. Work involving hydrofluoric acid will be performed by lab staff if visitors do not have prior hydrofluoric acid safety training.

Laboratory availability: Lab visitors can usually be accommodated with about 4 weeks of notice. Earlier scheduling, if possible, is encouraged to ensure instrument availability at the preferred time.

Contact information:

If you are interested in obtaining Sm-Nd, Lu-Hf, and/or U-Th-Pb chronology data in the University of Houston MC-ICP & LA MS lab or if you want to discuss potential projects please e-mail either:

Tom Lapen (tjlapen@central.uh.edu), or Rasmus Andreasen (randreas@central.uh.edu).