# Examining $^{87}Sr/^{86}Sr$ isotope ratios using LA-MC-ICP-MS in biogenic and hydrothermally derived minerals: Analytical challenges and new insights

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LA-MC-ICP-MS, which initiated during the mid 1990s as a reconnaissance tool, has become a present day staple of earth science research. Laser ablation mass spectrometry can be prone to analytical artifacts and larger uncertainties than traditional TIMS and solution based measurements. However, the speed and spatial scale of the laser analysis combined make this the preferred technique for many geochemical and biochemical applications.

At the Interdisciplinary Center for Plasma Mass Spectrometry at the UC Davis, we have conducted in situ $^{87}Sr/^{86}Sr$ isotope ratios of bioapatite, biocarbonate, epidote, calcite, anhydrite and barite. In most cases, strontium isotopes have shown to be a particularly useful geochemical tracer and the spatial resolution provided insight to processes that would not be observable using TIMS or solution measurements, We have found particularly in biophosphates and epidotes that a higher mass resolving power is advantageous relative to other means to attenuate and/or correct for spectral interferences. Further, we have developed rapid laser scanning capabilities, sophisticated user-friendly data reduction schemes and are currently working on imaging and visualization tools.

We have applied these new analytical protocols to a range of applications, notably fisheries biology, archaeology, paleoceanography, igneous and metamorphic petrology and have discovered that micron scale spatial resolution is imperative to the interpretation of the data.