

Advances in ‘clumped isotope’ measurement techniques using the Nu Perspective IS and Nu carb carbonate preparation unit

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The Nu Perspective IS is a stable isotope ratio mass spectrometer (SIRMS) capable of measuring the multiple isotopologues of carbon dioxide at masses 44 to 49. By coupling this SIRMS to the Nu carb carbonate preparation unit we have shown that precise and accurate measurements of isotopic ‘clumping’ in carbonates can be measured using an unprecedented small amount of material (300 µg). As in other systems the Nu carb liberates CO₂ from carbonates by acid digestion. After automated purification the isotopic ‘clumping’ in the CO₂ is then analysed by the measurement of Δ47. The reduction in sample size is achieved by using precisely matched sample and reference ‘micro volumes’ that allow the gas to deplete into the SIRMS at a precisely matched rate. This technique allows minimal waste of sample gas and maximum statistical counting time. Sample clean-up is provided by an automatic bakeable porapak cryogenic trap. The system is fully automated allowing routine Δ47 analysis, or conventional δ¹³C, δ¹⁸O analysis of carbonates. Results over a variety of standards and samples will be presented.