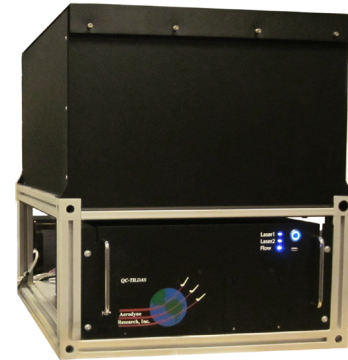


TILDAS Dual Laser Analyzer for Clumped Isotopes of CO₂ Derived from Carbonate

Direct Spectroscopic Measurement of ¹³C¹⁸O¹⁶O with No Isobaric Interference

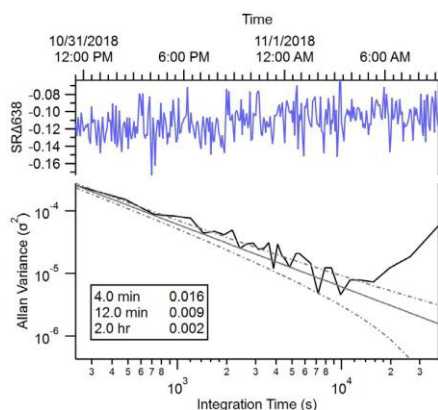


Features

- Direct measurement of ¹⁶O¹³C¹⁸O (⁶³⁸Δ) rather than mass 47 (⁴⁷Δ).
- Precision for ⁶³⁸Δ better than 0.02 ‰ for 4-minute measurement with less than 0.4 mg calcite.
- Precision for ⁶³⁸Δ better than 0.01 ‰ for 16-minute measurement with less than 1.6 mg calcite.
- Low operating costs.
- Suitable for CO₂ samples derived from carbonate via acid digestion.

TILDAS TECHNOLOGY

Aerodyne instruments use **tunable infrared laser direct absorption spectroscopy (TILDAS)** at mid-IR wavelengths to probe molecules at their strongest “fingerprint” transition frequencies. We further enhance sensitivity by employing a patented multi-pass broad-band absorption cell that provides optical path lengths up to 400 meters. Direct absorption spectroscopy allows for fast (<1 sec) absolute trace gas concentrations without need for elaborate calibration procedures. Moreover, TILDAS instruments are relatively free of measurement interference from other molecular species, enabling extremely specific detection.



Rugged, field-ready instruments

Direct absorption spectroscopy allows for highly specific and accurate gas detection

Mid-IR detection enables maximum measurement sensitivity

Applications

- Paleothermometry
- Geologic altimetry
- Burial, diagenesis and metamorphism
- Analysis of diverse concentrated CO₂ samples
- Analysis of CO₂ samples derived from marine carbonate.
- Analysis of diverse concentrated CO₂ samples.

Advantages

- Measurement precision comparable to much larger and more expensive IRMS instruments.
- Powerful TDLWintel software provides flexible instrument control and real-time data analysis.
- Valve control capable of complex scheduling and automatic background and calibrations.
- Optional automated sample handling systems.
- Turn-key design allows unattended operation.

Related Instruments

- Single laser isotope monitor for δ¹³C and δ¹⁸O of CO₂
- Single laser isotope monitor for δ¹⁸O and Δ¹⁷O of CO₂
- Dual laser monitor for CO₂ (δ¹³C, δ¹⁸O) and water (δ¹⁸O, δD) isotopes
- Dual laser monitor for CO₂ (δ¹³C, δ¹⁸O and Δ¹⁷O)

Clumped Isotopes for CO₂

Specifications

Discrete Sample Specifications for CO₂ Clumped Isotope Monitor

	CO ₂	$\Delta^{13}\text{C}^{18}\text{O}^{16}\text{O}$
One sample: <5 μ -moles CO ₂ 4 min measurement	0.02 ppm	0.035‰
10 Samples: <50 μ -moles CO ₂ 40 min measurement	0.01 ppm	0.01‰

Note: These measurements are normalized to a working reference and the time to do so is included in the quoted measurement time. The working reference has a mixing ratio, pressure and matrix composition similar to the sample.

Data Outputs

RS-232, USB drive, ethernet

Size, Weight, Power

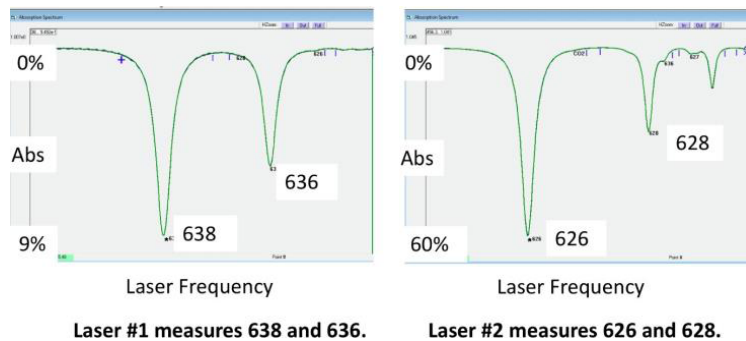
Dimensions: 560 mm x 770 mm x 640 mm
(W x D x H)
Weight: 75 kg
Electrical Power: 250-500 W, 120/240 V,
50/60 Hz (without pump)

Installation

Benchtop system

Flushing the optics with CO₂-free gas is recommended

Infrared Spectroscopy for Clumped Isotope Determination



Instrument Operations

Operating temperature: -20 to +40 °C
Sample flow rate: 0 to 20 slpm

Instrument Components

Core instrument
Thermoelectric chiller
Keyboard, mouse, and monitor
Vacuum pump (customer specified)
Inlet sampling system (customizable)

Aerodyne specializes in collaboration and custom design. Please contact us if you would like to discuss additional measurement options and applications.

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