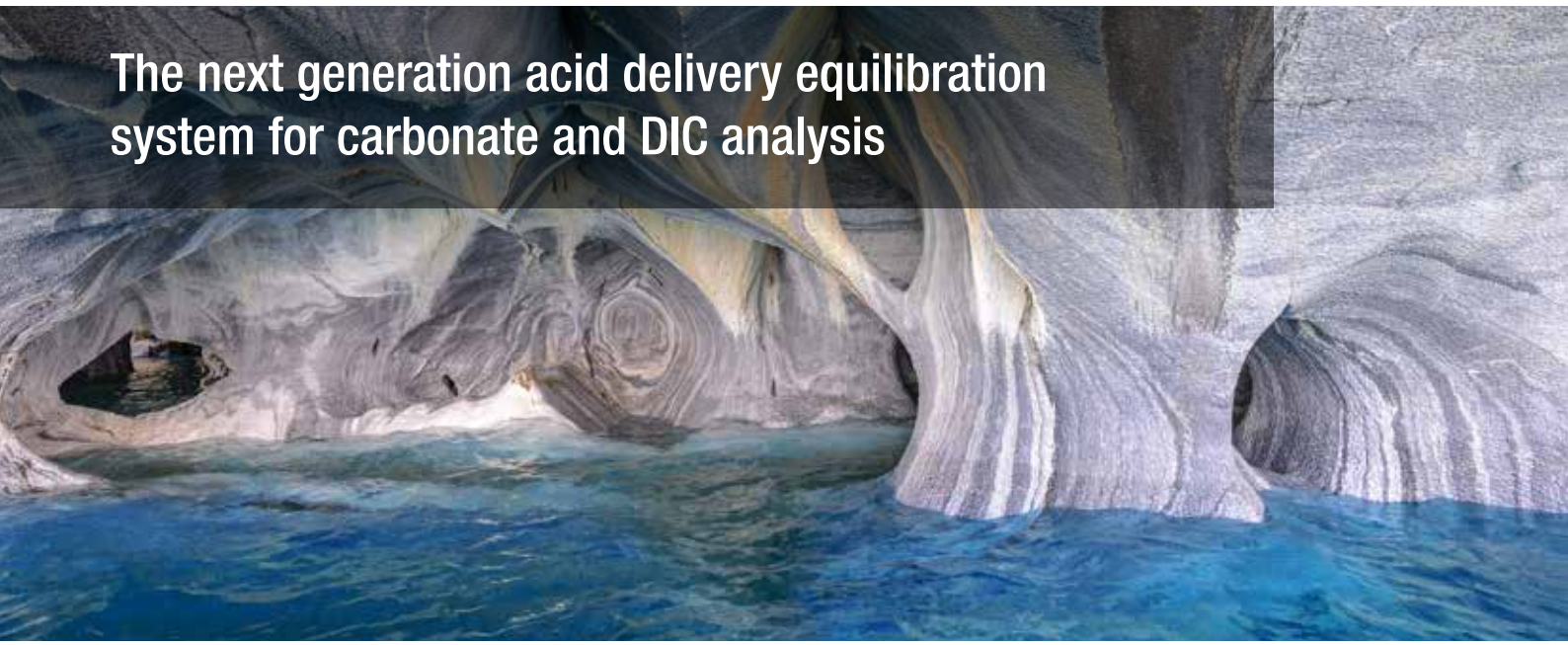
sercon
innovators in isotopes

# The Sercon µCarbs



## The next generation acid delivery equilibration system for carbonate and DIC analysis

### Key features include:

- Dual needle system with separate needles for acid delivery and headspace flush / sample transfer which optimise flow rates and minimise blockages
- Temperature programmable heated sample tray optimises reaction rates (±0.1°C)
- Sample tray holds up to 170 6 ml or 12 ml vials which can be analysed in a single, unattended run. Alternative trays can be provided for larger vials
- Phosphoric acid reservoir held within the heated sample tray ensures smooth acid delivery and minimises acid crystallisation
- Acid resistant lids manufactured from Ertalyte on the sample trays minimises accidental acid corrosion
- The hyphenated µCarbs-HS2022 system generates high precision isotopic data from carbonate and dissolved inorganic carbon (DIC) samples. The high sensitivity source in the HS2022 ensures excellent precision at extremely small sample sizes
- The flexible system also allows the stable isotopes of water to be analysed via water equilibration and gas analysis such as $CO_2$ in breath or atmospheric samples

### Sample measurement:

- $\delta^{18}O$ and $\delta^{13}C$ in $CO_2$ in carbonates
- $\delta^{13}C$ in dissolved inorganic carbon (DIC)
- $\delta^{2}H$ and $\delta^{18}O$ in water and other aqueous samples
- $\delta^{13}C$ on breath and other gaseous samples, including atmospheric samples

# The Sercon µCarbs. The next generation acid delivery equilibration system for carbonate and DIC analysis

## Carbonate and DIC analysis

The sample vial is placed inside the heated sample tray set to the required temperature. The headspace of the vial is flushed with helium, then a second needle delivers phosphoric acid, in order that $CO_2$ be generated via the reaction below. After the equilibration time has elapsed, the headspace is transferred to the IRMS for isotopic analysis.

$CaCO_3 + H_3PO_4 \rightleftharpoons CaHPO_4 + CO_2 + H_2O$

## Water and other equilibration measurements

The sample vial is placed inside the heated sample tray set to the required temperature. The headspace of the vial is flushed with a mixture of helium and $CO_2$ or $H_2$ (depending upon which isotope is to be measured), in order that the reaction below can take place inside the vial. After the equilibration time has elapsed, the headspace is transferred to the IRMS for isotopic analysis

## Oxygen isotope equilibration

$C^{16}O_2 + H_2{}^{18}O \rightleftharpoons C^{16}O^{18}O + H_2{}^{16}O$

## Hydrogen isotope equilibration

$^1H_2O + {}^1H^2H \rightleftharpoons {}^1H^2HO + {}^1H_2$

## Gas analysis

No sample pre-treatment is required and the sample can be measured directly. The sample is simply transferred from the vial to the IRMS via the sampling needle.

## Autosampler

Sercon produce the most elegant autosamplers using advanced engineering technologies. The design is robust, reliable, easy to operate and maintain.

## Service and Support

At Sercon we pride ourselves on the support available to customers, and consistently receive good feedback on the service we provide. We offer support via telephone, email and remote log on. If an engineer visit is necessary we provide rapid on-site response from our team of specialist, experienced engineers.

All users receive training as part of the installation programme. We can also provide further training on specific applications and tailor your course to your analytical needs.

## Power and Gas Requirements

| | |
|---|---|
| Power | 100-240 VAC |
| Helium | 99.998% |

## Specifications

| Sample type | Sample size | Isotope | Precision (1σ) |
|---|---|---|---|
| Carbonate | 500 µg | $\delta^{13}C$ | 0.08 ‰ |
| | | $\delta^{18}O$ | 0.08 ‰ |
| | 100 µg | $\delta^{13}C$ | 0.08 ‰ |
| | | $\delta^{18}O$ | 0.1 ‰ |
| | 50 µg | $\delta^{13}C$ | 0.1 ‰ |
| | | $\delta^{18}O$ | 0.12 ‰ |
| DIC | 15 ppm | $\delta^{13}C$ | 0.15 ‰ |
| Water | 200 µl | $\delta^{18}O$ | 0.1 ‰ |
| | | $\delta^{2}H$ | 2 ‰ |
| Atmospheric $CO_2$ | 12 ml | $\delta^{13}C$ | 0.1 ‰ |
| | | $\delta^{18}O$ | 0.2 ‰ |
| Breath $CO_2$ | 12 ml | $\delta^{13}C$ | 0.1 ‰ |

Tel: +44 (0)1270 580008
Email: sales@sercongroup.com
www.sercongroup.com

June 2019

sercon
innovators in isotopes