SerCon

The *Stable* Isotope Company

GC-CP Combustion / Pyrolysis Interface

The GC-CP interface is a Gas Chromatograph and gas conversion continuous flow interface for a 20-20 or GEO series isotope ratio mass spectrometer.

When combined with the 20-20's novel 120° high dispersion ion optics, the interface provides the capability of measuring D/H, $^{13}C/^{12}C$, $^{15}N/^{14}N$ and $^{18}O/^{16}O$ ratios in compounds separated by GC. The GC-CP interface is fully integrated with Hewlett Packard and other gas chromatograph to preserve chromatography during the gas conversion process, ensuring that sample peaks are well resolved when they reach the stable isotope analyser.

In combustion mode, peaks eluting from the capillary GC enter the combustion tube and are converted over and oxidative surface (at 800°C) to CO_2, N_2, NOx and H_2O. An elemental copper stage reduces NOx, a Nafion dryer removes water vapour and a simple liquid nitrogen trap focuses CO_2 (when measuring N_2 to prevent CO formation in the mass spectrometer ion source). A further GC plot column can be used to separates CO_2 from N_2 (allowing dual isotope analysis).

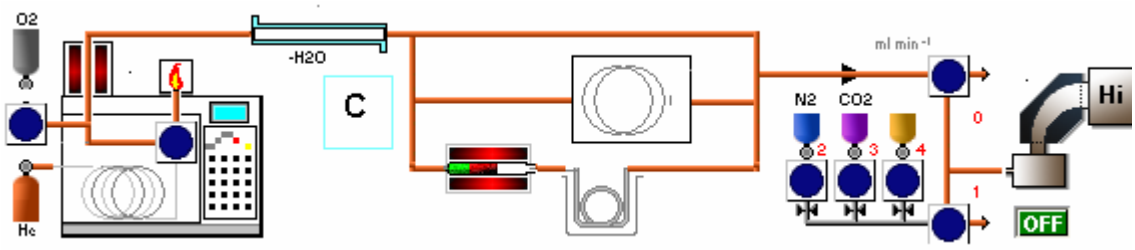
In pyrolysis mode, peaks eluting from the capillary GC enter the pyrolysis tube (1200°C). The pyrolysis products, CO, N_2, and H_2 are purified by chemical processes. A Nafion dryer guards against any water vapour contamination (e.g. if the pyrolysis chemicals become exhausted). A post reaction Poraplot-Q or Molsieve 5a open tubular column are used to separate analyte gases from minor biproducts of thermal decomposition.

External Precision :

Gas	Ref Gas (‰ vs ref)	Norm. on-column (‰ vs ref)	Small on-column (‰ vs ref)
CO_2 (^{13}C)	0.1*	0.2 (100 ng)	0.5 (10 ng)
CO (^{18}O)	0.1*	0.4 (160 ng) 0.4 (1 nl H_2O)	-
N_2	0.1*	0.5 (100 ng)	1.5 (14 ng)
H_2	1.5*	4.0 (250 ng) 3.0 (5 nl H_2O)	-

SD for 5 injections of samples at natural abundance. For comprehensive specifications of each interface see separate precision data sheet for the 20-20. Figures in brackets represent nanograms of element on-column.

* Major beam of 10 nano amps

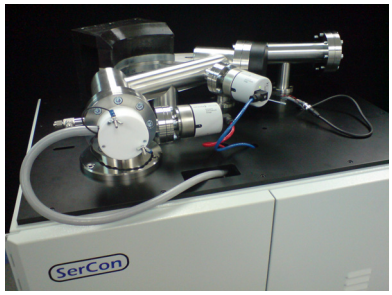


Actual Screen Graphic from SerCon Callisto Software

Key Features Include:

- **Full integration with many high performance gas chromatographs and their autosamplers.**
- **Versatility of analysis through design - user can choose to work in combustion or pyrolysis modes through having the facility to operate at temperatures up to 1200°C.**
- **Thermally stable gas train - while the gas control side is composed of high quality stainless steel diaphragm regulators, the reaction oven is almost entirely composed of fused silica lines to ensure that joints remain sealed during temperature gradients in the GC oven.**
- **Integral post-reaction gas chromatograph for separation of analyte gases prior to entering the stable isotope analyser.**
- **Helium interface flow prior to the reaction phase which preserves chromatography through the interface and provides the additional pressure required to drive the reaction gases through post reaction GC stage.**
- **Dynamic water removal by low dead-volume Nafion membrane.**
- **Reoxidation of the combustion chemicals is easily achieved by using the built in oxygen regeneration line connected to the helium interface flow, avoiding the need for extra valves and 'backflushing'.**
- **Stand-alone multipurpose 1000°C furnace option (usually used for reducing NOx).**
- **Total software control of the instrument system and data processing. Allows storage of sample analysis protocols to comply with good laboratory practice. Unique isotope ratio calculation method which removes the interference of changing backgrounds caused by column bleed. Unique data reduction technique that allows 'intra peak' H3+ subtraction when measuring hydrogen isotopes. Inter-file import/export facility from instrument PC to laboratory server or internet (allows rapid updating of software or transfer to common spreadsheet packages). Fully compatible with Windows 3.1, 95 and NT.**

The GC-CP interface is a bench-top preparation module ready to be connected to the continuous flow interface of our 20-20 or GEO 20-20 series of isotope ratio mass spectrometers.



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