CM190

Surface Carbon Analysis

By High Temperature Oxidation and Coulometric Detection

Applications include: *Cold rolled steel surfaces, Silicon wafers and substrates, Galvanized and aluminum surfaces, Catalysts, Glass*

The CM190 Surface Carbon Analyzer is a complete analytical system capable of measuring organic and non-organic surface carbon on a wide variety of non-combustible materials including metals and glass. Combining two high-temperature oxidation furnaces and a highly sensitive CO_2 detector, the CM190 provides a direct measurement of surface carbon levels without the need for calibration using difficult-to-obtain surface carbon "standards". TheCM190 system includes the following components pictured above:

CM5015 CO_2 Coulometer

- No user calibration
- Wide, linear dynamic range
- Readability to 0.01 ug Carbon
- User selectable display units
- 10" LCD Touch Screen
- SD Card data storage
- LIMS Compatible

CM5380 Dual Zone Furnace with CM5381 Furnace Kit

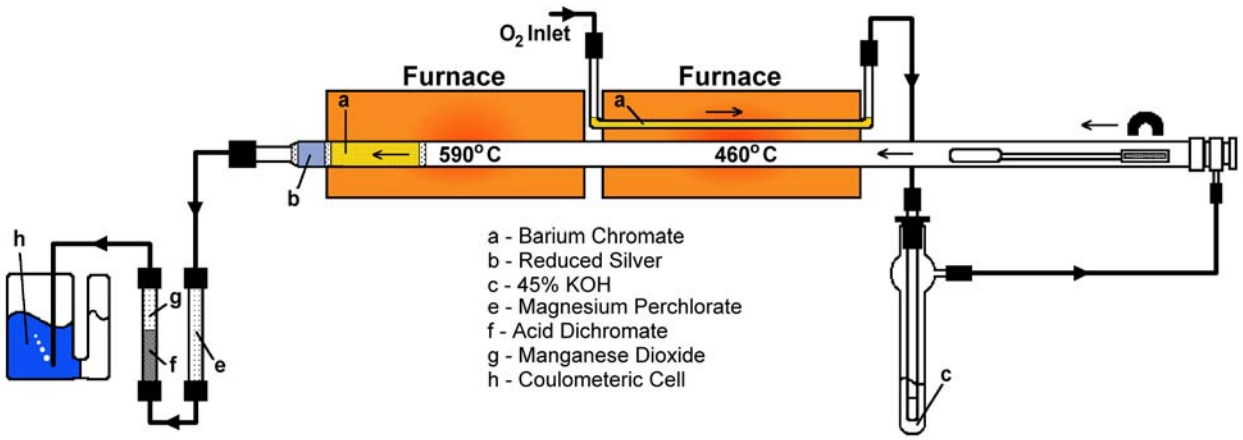
- Programmable up to 1100^{O}C
- Pre-combustion scrubbers for removal of interferences from oxygen carrier gas
- Post-combustion scrubbers for removal of interfering gases formed during sample combustion
- Sample introduction using porcelain boats and manipulator rod

Instrument Capabilities

A major advantage of the CM190 Surface Carbon Analyzer is the use of coulometric detection. Employing the principles of Faraday's Law, the CM5015 CO_2 Coulometer automatically measures the absolute mass amount of carbon dioxide resulting from sample combustion. No user-calibration is required and linear detection is available from less than 1 ug carbon to over 10,000 ug carbon. Using this 100% efficient coulometric process, relative standard deviations of 0.2% or better are common for samples containing 1000 to 3000 ugC. For smaller concentrations, an absolute deviation of approximately 1 ug C is typical.

Oxidation times vary with sample type and temperature although 10 to 15 minute analyses are typical.

Principles of Operation



Surface Carbon

Prior to analysis, the furnace temperatures are selected based on the characteristics of a particular sample type in order to separately oxidize the organic or non-organic surface carbon components. The sample is then introduced into the pure oxygen atmosphere within the lower-temperature furnace in order to oxidize the organic surface carbon to form CO_2. After all organic components are evolved, the sample is then moved to the higher-temperature furnace where the inorganic carbon components are oxidized. Interfering reaction products (including sulfur oxides, halides, water and nitrous oxides) are removed by the post-combustion scrubbers. The resulting carbon dioxide is then swept into the CM5015 CO_2 Coulometer where it is automatically measured using absolute coulometric titration.

Typically, samples are placed within a large porcelain boat and are introduced and withdrawn from the furnace via the manipulator rod.

Data Handling

Names, weights and sizes of up to 50 samples can be entered, to be used by the CM5015 in calculating the final result. Analytical progress is displayed on the 10” LCD touch screen in user-selectable units. Detailed analysis information is automatically saved to an on-board SD card after each sample. Data can also be transmitted through the standard serial and Ethernet ports to be captured on a personal computer or LIMS. In addition, a detailed report can be printed to the optional small format printer while each sample is running.

Ordering Information

CM190 – Surface Carbon Analyzer

Includes: CM5015 CO_2 Coulometer, CM5380 Dual Zone Furnace and CM5381 Furnace Kit with tools and accessories for the analysis of samples. (P/N CM190-01 110V, 50/60Hz) (P/N CM190-02 220V, 50/60Hz)

Optional Equipment:

Printer – 3” format impact printer. Includes cable, power supply, paper and ribbon. (P/N CM124-078)

UIC INC.
1225 Channahon Rd., Joliet, IL 60436
PO Box 863 Joliet, IL 60434-0863
800-342-5842 (USA) 815-744-4477 (Illinois)
Email: uicsales@uicinc.com Web: www.uicinc.com