PREMIER COREX

Thin Section Imaging

Optical Microscopy

The formation material is cleaned and dried in a low-temp oven and powdered in a Retsch MM 400 mixer mill within tungsten-lined vials using tungsten grinding balls. Although only 0.1 of powder is used for the analysis, 1g is processed to insure representivity and homogeneity for each sample. The powdered material is placed in a 20 mL borosilicate beaker and treated with 3 mL concentrated hydrochloric acid (standard 36% aqueous HCl) at room temperature for a minimum of 2 hours to remove carbonate phases that contain inorganic carbon. If the sample is hydrophobic, the use of a surfactant (Leconal in deionized water) mixed with the acid is necessary. Following acid treatment, 10 mL of deionized water is added to the sample beaker. The entire sample solution is then filtered using a water-aspirator system with a low-carbon (0.05 wt%) glass microfiber filter to remove all acid. The decarbonated powder is subsequently transferred into a ceramic LECO crucible and heated in a dryer-oven at 70°C for a minimum of 1 hour to remove all remaining moisture. After drying of the powder, the crucible is removed from the oven, and a small amount of copper shavings are added to the dried powder in the crucible. This metal "accelerant" facilitates rapid induction heating of the sample in the LECO instrument.

Each sample is run for a minimum of 25 seconds to a maximum of 80 seconds in the LECO C744, an induction furnace that operates on a power supply of 25A and 230V. The sample powder is combusted in the presence of UHP Oxygen at 1200oC to produce both carbon monoxide (CO) and carbon dioxide (CO2) gases. The generated CO is converted to CO2 by a catalyst, and the total CO2 is measured by a calibrated infrared (IR) absorbance cell to obtain the TOC value in wt%.

The LECO C744 instrument is calibrated with standards provided by the manufacturer having well-characterized TOC values ranging from 0.134 wt% to 42.4 wt%. The instrument IR absorbance cell has an analytical range of 0.002 wt% to 60 wt% carbon for 100 mg of sample material. Two check standards are routinely analyzed after every 10 unknown samples to monitor instrument drift, one with a known value of 1.03% and the other with 5.00%. Random and selected sample reruns are periodically performed to verify the initial values obtained. The acceptable standard deviation for TOC from the check standards is 3% (relative) from the established values.

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