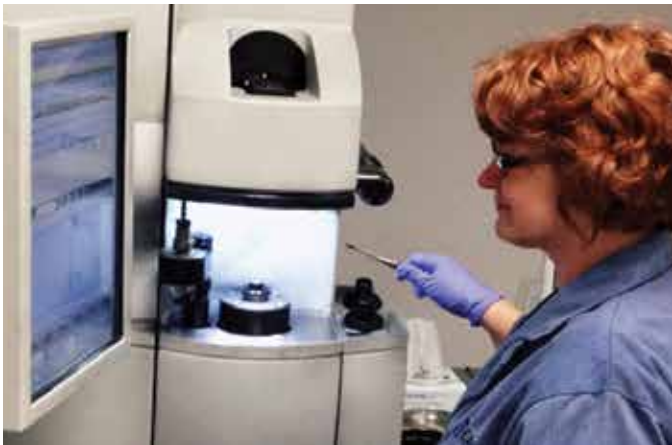


TECHNIQUE NOTE

# Instrumental Gas Analysis (IGA) Services

## INTRODUCTION

Instrumental gas analysis (IGA) measures gas-forming elements (C, H, O, N and S) present in samples from ppm to percentage levels. A high temperature furnace is used to rapidly heat the sample under flowing gaseous stream and releasing above elements from the sample for detection on a variety of detectors.



Carbon and sulfur are measured based on combustion and infrared detection. The analytical method is based on the complete oxidation of the solid sample by combustion in an oxygen plasma. The sample is placed in a ceramic crucible in a high frequency induction furnace where it is combusted. The combustion of the sample releases various gases, which are measured by infrared detectors. The sulfur content of the sample is determined by analyzing the  $\text{SO}_2$ . The carbon content is evaluated from analyzing  $\text{CO}$  and  $\text{CO}_2$  gases released from the sample.

Nitrogen, oxygen and hydrogen are measured using inert gas fusion or hot extraction techniques. The sample is placed in a graphite crucible and inserted into a furnace, where it is held between the electrodes. After purging with an inert gas (He or Ar), a high current is passed through the crucible, increasing the temperature in the crucible above  $2000^\circ\text{C}$ . Any gases generated in the furnace ( $\text{CO}$ ,  $\text{CO}_2$ ,  $\text{N}_2$ ,  $\text{H}_2$ , or  $\text{H}_2\text{O}$ ) are released into a flowing inert gas stream, which is directed to the appropriate detector: infrared or Thermal Conductivity Detector (TCD). Instrument calibration is performed using known reference materials.

