CATALYTIC COMBUSTION IONIZATION

DET introduces a GC detection method that selectively ionizes Methylene (CH_2) groups in Petroleum, Biofuel, and FAME samples

Principle of Detection

Fuel compounds elute sequentially from a GC column into a detector gas environment containing Oxygen. Compounds containing a sufficiently high concentration of CH_2 groups ignite a momentary burst of flame ionization as they impact a heated, catalytically active ceramic surface.

Important Consequences of this Chemical Detection

1. Demonstrates that high temperature oxidation of CH_2 groups is a primary process contributing to combustion ignition of Petroleum, Biofuel, and FAME constituents.

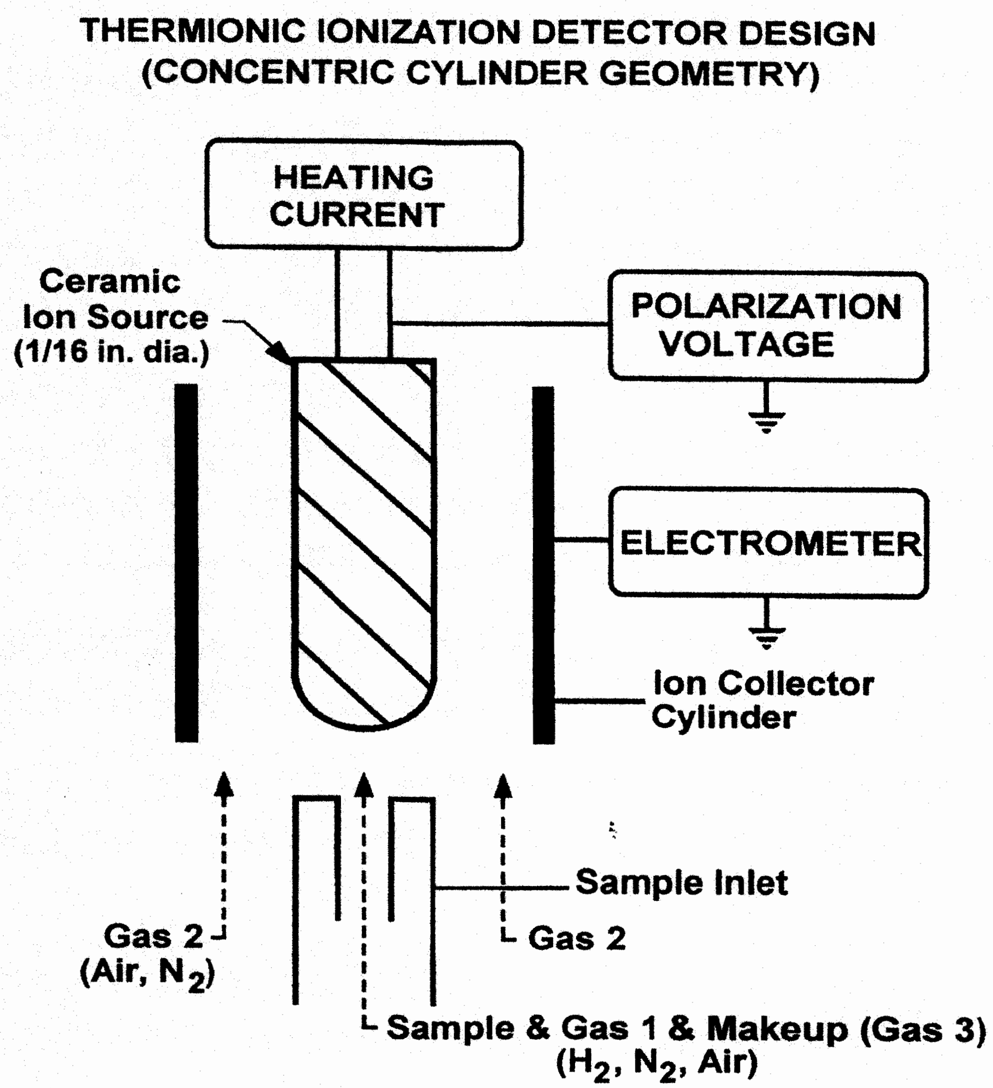
2. The temperature required for ignition of fuel combustion is lowered with increased catalytic activity of the ceramic.

3. GC chromatograms of different fuel samples provide fingerprint patterns showing the most combustible components of each sample.

4. Compounds with saturated Carbon bonds ignite in combustion more easily than compounds with Carbon double bonds.

5. Aromatic Hydrocarbon compounds are NOT easily ignited in combustion by this technique.

CATALYTIC COMBUSTION IONIZATION EQUIPMENT



Catalytic Combustion Ionization - detection gases 1, 2, and 3 are Air. Oxygen, or other Oxidizing gas - ceramic ion source is electrically heated to 300 - 400 °C - sample is a Hydrocarbon or other Organic compound that momentarily ignites a burst of flame as it impacts the hot ceramic - process identifies those constituents of a complex fuel sample that most easily ignite in combustion - additives in the ceramic surface affect its catalytic activity and that in turn affects the temperature required for ignition.