



## TECHNICAL UNIVERSITY OF CRETE

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### Research Unit: “Hydrocarbons Chemistry & Technology”

One of the basic research directions in our group is the *instrumental analysis* and the *characterization* of fossil fuels (oil, natural gas, coal e.t.c.).

During the last 10 years we have been involved in many projects dealing with the analysis and characterization of *organic pollutants in the environment*, produced during production and use of fossil fuels.

In environmental studies, we employ a series of *chemometric techniques* for the identification and characterization of petroleum derived pollutants (*fingerprinting*).

All the analytical equipment, appropriate for the analytical characterization of organic pollutants in *solid, liquid and gaseous samples are available*

## ***Free oily phase***

Detailed compositional characterization. Determination of spill origin. Estimation of the pollutants “age”.

### Available analytical methodologies

Chemical fingerprinting by gas chromatography GC-FID

Chemical fingerprinting by gel permeation chromatography GPC

Determination of PAH by gas chromatography–mass spectrometry GC-MS [EPA 8270C]

Determination of volatile organics (VOCs) using Pyroprobe-GC-FID



HPLC

## ***Soil samples***

Detailed compositional characterization of hydrocarbon pollutants in soil samples.

### Available analytical methodologies

Total petroleum hydrocarbons (TPH) by gas chromatography GC-FID [EPA 8015B]

Volatile organics (VOCs-BTEX) by gas chromatography – mass spectrometry GC-MS [EPA 8260B]

Semi-volatile organic components – Polynuclear aromatics (SVOCs-PAH) by gas chromatography–mass spectrometry GC-MS [EPA 8270C]



GC-FID

## ***Liquid samples***

Detailed compositional characterization of hydrocarbon pollutants in water samples

### Available analytical methodologies

Total petroleum hydrocarbons (TPH) by infrared spectroscopy FTIR [EPA 418.1]

Total petroleum hydrocarbons (TPH) by gas chromatography GC-FID [EPA 8015B]

Volatile organic components (VOCs – BTEX) by gas chromatography Solid phase microextraction GC/SPME and gas chromatography–mass spectrometry GC-MS/purge & trap [EPA 8260B]

Semi-volatile organic components – Polynuclear aromatics (SVOCs-PAH) by gas chromatography–mass spectrometry GC-MS [EPA 8270C]



FTIR

## ***Gaseous samples***

Preconcentration and analysis of hydrocarbons – pollutants in gaseous samples. Determination of hydrocarbons in soil gas.

### Available analytical methodologies

Total petroleum hydrocarbons (TPH) using extraction and gas chromatography GC-FID [EPA 8015B]

Total petroleum hydrocarbons (TPH) by thermal desorption (TDU) and gas chromatography–mass spectrometry GC-MS



GC-MS

## ***Available sample extraction and preconcentration techniques***

Liquid-liquid extraction [EPA 3510C]

Soxhlet extraction for soil samples [EPA 3540C]

Solid phase microextraction SPME

Purge & Trap [EPA 5030]

Thermal desorption unit (TDU) [modified EPA 5041A]

Ultrasonic extraction [EPA 3550]



Soxhlet



Thermal desorption unit



SPME unit



Purge&Trap unit