ORGANIC GEOCHEMISTRY ANALYTICAL PLATFORM

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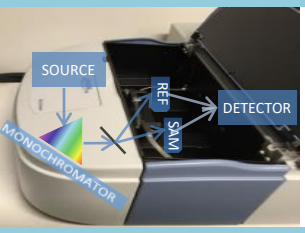
AIMS : Identification and quantification of organic compounds in environmental matrix : soils, sediments, water, rocks, meteorites, plants etc.

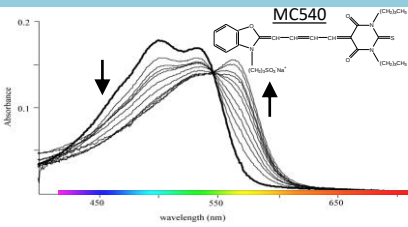
UltraViolet-Visible Spectroscopy



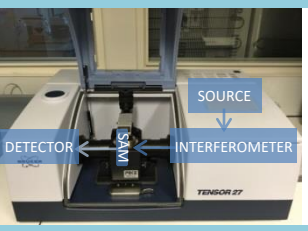
- Absorption of emission rays in UV (185-400nm) and Visible (400-700nm) by electrons.
- Inform on main functional groups.
- Quantitative analyses, kinetic reaction, dissociation and complexation constants determination.

Example :

MC540 (solvatochromic probe) : when its microenvironment polarity decreases, its absorption spectra moves towards red.



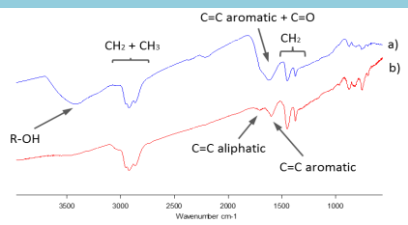
Fourier-Transform InfraRed spectroscopy



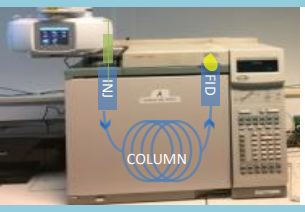
- Absorption of emission rays in mid- InfraRed (4000-200 cm^{-1}) by vibration and / or rotation of atom bonds in molecules.
- Inform on main functional groups.
- Possibility of quantitative analyses, but mostly qualitative.

Example :

Spectra of insoluble organic matter synthesized with :
(a) octan/ethanol : 1/4
(b) octan



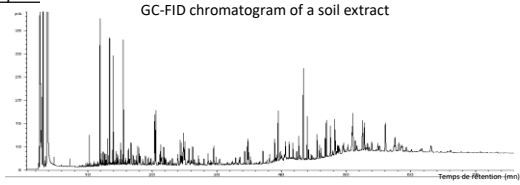
Gas Chromatography – Flame Ionisation Detector



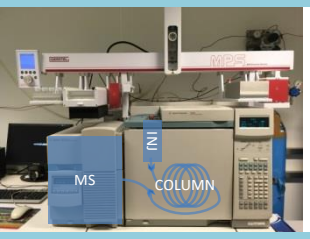
- Volatilization then separation of compound mixtures, using a vector gas along a column coated with a stationary phase.
- Detection with a Flame Ionisation Detector (FID).
- Quantitative and qualitative analysis.

Example :

GC-FID chromatogram of a soil extract



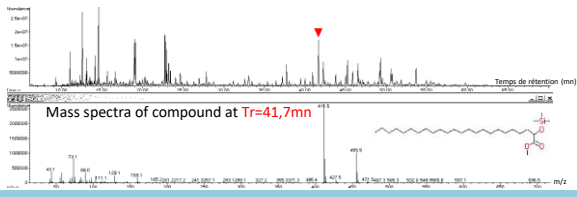
Gas Chromatography – Mass Spectrometry



- Identification of molecules separated by GC : Ionisation and fragmentation of each molecule, leading to a characteristic mass spectra.
- Mass spectra compared to the NIST library = identification
- Quantitative and qualitative analyses.

Example :

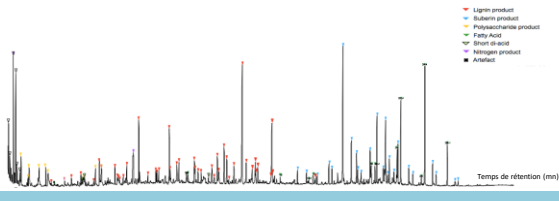
GC-MS chromatogram



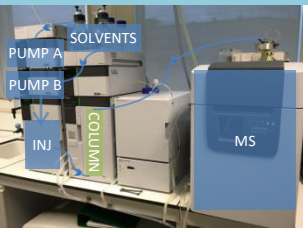
Pyrolisis – Gas Chromatography – Mass Spectrometry

- Macromolecule cracking by Curie Point pyrolysis into smaller molecules, followed by GCMS analysis .
- As a puzzle, each macromolecule is fragmented into smaller pieces.
- The puzzle is rebuild thanks to the pyrochromatogram.
- Quantitative and qualitative analyses.

Example : Pyrochromatogram of oak bark



Liquid Chromatography – Mass Spectrometry



- Separation of compounds from a liquid matrix, using a liquid mobile phase, in a column, coated with a stationary phase.
- A soft ionization creates characteristic molecular ions for each molecule.
- Quantitative and qualitative analyses.

Example : Chromatogram of a soil extract