

(NMR) Nuclear Magnetic Resonance Spectroscopy in solution

Principle

NMR spectroscopy is an analytical technique capable of giving a lot of information regarding structure and purity of samples.

Working principle is based on the fact that, in the presence of a high external magnetic field, a spin active nucleus can interact with a specific radiofrequency (nucleus dependant) absorbing it and then emitting a so-called FID, an exponential and sinusoidal sum of radiorequencies, which contains structural-related information.

Most common spin active nuclei are, for example, ^1H , ^{13}C , ^{19}F , ^{29}Si and ^{31}P .

Capabilities




NMR in solution is a wide ranging technique: both qualitative and quantitative analyses and structural characterization can be done.

Conditio sine qua non is that samples must be liquid or soluble in deuterated solvents (not necessary when observing ^{19}F nucleus).

Most common analyses are:

- Polymers composition and chain ends analyses
- Fluids characterization and chain ends analyses
- Structural studies
- Identification and quantification of by-products, contaminants and impurities
- Purity evaluation of raw material
- Determination of fluorinated residual in water (process or waste water)

Assets

	Asset	Details
	Agilent NMR Inova 400	operates at: 399.86 MHz for ^1H 376.21 MHz for ^{19}F equipped with: 5-mm triple resonance $^1\text{H}/^{19}\text{F}$ { ^{13}C , ^{31}P } PFG probe 5-mm ASW PFG probe (to assess other nuclei ^{29}Si , ^7Li , ^{11}B , etc)
	Agilent DirectDrive System 500	operates at: 499.86 MHz for ^1H 470.30 MHz for ^{19}F ; equipped with: 5-mm triple resonance $^1\text{H}/^{19}\text{F}$ { ^{13}C , ^{31}P } PFG probe 5-mm HF direct detection probe
	Agilent Mercury 300 (open access)	operating at 299.89 MHz for ^1H 282.15 MHz for ^{19}F equipped with: 5-mm ASW PFG probe (4-Nuc $^1\text{H}/^{19}\text{F}/^{13}\text{C}/^{31}\text{P}$ configuration)