

analytical chemistry

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Analytical chemistry is the study of composition of matter, focusing on separating, identifying and quantifying chemical components.

old method of analysis	<ul style="list-style-type: none"> NMR Spectroscopy determine detail info on molecular structure. Range = 4MHz - 750MHz 	<ul style="list-style-type: none"> atomic Spectroscopy determine elemental composition
Combustion Analysis		
<ul style="list-style-type: none"> Only Organic compound Product CO₂ & H₂O measured 		
mole ratio → atomic ratio → empirical (e) formula	<ul style="list-style-type: none"> Radiofrequency Active Spin = odd Unactive = even → Proton 	<ul style="list-style-type: none"> excitation & deexcitation of e⁻ discontinuous spectrum
modern method Spectroscopy	<ul style="list-style-type: none"> absorb Radio = flipping to high energy level spin. 	<ul style="list-style-type: none"> emission: bright lines on dark absorption: dark lines on bright gas: emit liquid: absorb. high temp low temp
Interaction of electromagnetic Radiation with matter.	Proton NMR:	
types:	<ul style="list-style-type: none"> chemical shift δ (ppm) Positioning proton with environment 	
<ul style="list-style-type: none"> IR Spectroscopy:- Vibrational Spectroscopy molecular vibration λ = 2.5 μ - 100 μm. wave no $\bar{\nu} = 4000\text{cm}^{-1} - 625\text{cm}^{-1}$ Polar active compound → finger print Region vibrational change occurs by specific absorption of IR → functional group Region Specific groups absorb specific λ & give diff peaks. 	<ul style="list-style-type: none"> UV Spectroscopy: electronic Spectroscopy transition occurs. HOMO → LUMO λ_{UV} = 200 - 400nm λ_{visible} = 400 - 800nm determine Conc & structure. σ → σ*, π → π* n → σ*, n → π* 	<ul style="list-style-type: none"> mass Spectroscopy measure m/e of ions to identify & quantify molecular specie & structure m/e = $\frac{h^2 \gamma}{E}$ light ions = less m/e → more deflection angle heavy ions = more m/e → less deflection angle Relative abundance = $\frac{\text{mass of isotope} \times \text{Natural abundance}}{100}$



Page No.

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