

The **Isotope Fingerprints** and What They Tell Us for Tracing Pollution Sources and Environmental Change

History can't hide from the Isotope Hunter. Natural and synthetic materials in our air, water and land can be effectively examined by detecting their unique chemical signature—their isotope fingerprints. Trace your sample history with the Thermo Scientific™ Isotope Ratio Mass Spectrometry portfolio.

¹³Carbon

Interprets: Botanical origin C3, C4 and CAM photosynthesis

Identifies: Fossil fuel burning, natural fires/biogenic emissions, particulate matter source (PM_{2.5} to PM₁₀), mineralization processes

Materials Analyzed: Soils, sediments, water, filters (air and water), gas and biomass

¹⁸Oxygen

Interprets: Local-regional rainfall hence geographical area

Identifies: Particulate matter source (PM_{2.5} to PM₁₀), fertilizer tracing (nitrate in water)

Materials Analyzed: Soils, sediments, water, filters (air and water) and biomass

¹⁵Nitrogen

Interprets: Soil processes, plant fertilizer trophic level

Identifies: Particulate matter source (PM_{2.5} to PM₁₀), industrial and vehicle emissions, fertilizer tracing (nitrate in water)

Materials Analyzed: Soils, sediments, water, filters (air and water) and biomass

³⁴Sulfur

Interprets: Local soil and geology conditions, proximity to shoreline

Identifies: Particulate matter source (PM_{2.5} to PM₁₀), proxy for natural events and weathering processes, fertilizing tracing

Materials Analyzed: Soils, sediments, water, filters (air and water) and biomass

²Hydrogen

Interprets: Local-regional rainfall geographical area

Identifies: Biodegradation and pathways of organic contaminants, source discrimination of fossil fuel

Materials Analyzed: Soils, sediments, gas and biomass

Detecting ¹³Clues, tracking ¹⁸Origin, unraveling ²History with isotope fingerprints
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