# Laboratories

# **GCxGC** Analysis

## Overview

AGAT Laboratories is the premier commercial lab in North America equipped to offer GCxGC analysis. Our state-of-the-art GCxGC analysis transforms biometric signature recognition into multi-dimensional fingerprinting capable of far more precise identification of compounds, potentially assisting in identifying the geologic formation, and producer of a given hydrocarbon.

Multiple forensics lab and environmental services can benefit from our multi-dimensional GCxGC analysis. GCxGC expands on characterization data to provide a second dimension to all traditional GC analytical packages for a truly comprehensive result. An analogy comparing 1-D GC (below in white) with 2-D GC (heat map below) can be made with biometric signature recognition and much higher resolution fingerprint analysis—enabling the ambiguous to become certain.





2-D GC

# **GCXGC Methods**

GCXGC methods can separate biogenic and petrogenic compounds providing unambiguous answers with multiple lines of evidence to support a definitive site assessment. This data helps our clients by providing ecologically relevant site assessments, enabling protection of sensitive site receptors.

GCxGC provides complete testing of multivariable and unknown constituent releases or products in releases—including PAHs—to estimate physicochemical properties, help characterize environmental persistence and degradative processes, and monitor environmental fate and toxicity over time. Using GCxGC, we can create a unique product profile, enabling better source attribution, potentially even to the specific refinery, geological formation, or gas station the product is from. Our GCxGC services have been expanded to include Ignitable Liquid Residue analysis. This analysis is traditionally performed by one dimensional gas chromatography where all parameters elute in a single dimension and all peaks, whether from the substrate or from actual ignitable liquids, are comingled together. This leads to interferences in the pattern and can lead to inconclusive results or incomplete identifications of ignitable liquids in samples.

Fire debris samples in general are very complex sample types and no one sample is the same leading to innumerable different interference types that can occur due to the many different substrates that can combust. The use of two-dimensional gas chromatography can greatly reduce these interferences and hindrances due to its set-up and second dimension separation.



GCxGC 3D surface map

### GCxGC Lab Services

- Spill characterization through full fingerprint analysis providing comprehensive source determination.
- Accelerated site closures through identification of potential biogenic interference with multiple lines of evidence.
- Release aging using advanced degradation and weathering analysis of petroleum and fuel spills.
- Advanced risk assessment, made more comprehensive and complete through a second dimension of separation.
- Expanded ignitable liquid residue analysis with improved separation and visualization of various compounds present.

### Custom Analytical Packages

AGAT Laboratories is continuously working to add analytical packages in line with your needs and will work directly alongside you to deliver tailor made analytical packages. If a desired analysis is not available directly through AGAT, we will reach out to our vast network of carefully selected partners to support your programs needs.