PURITY MATTERS
REDEFINE HIGH PURITY ANALYSIS AND
DRIVE TECHNOLOGY INNOVATION
Purity Matters

The type, concentration and spatial distribution of impurities are of particular concern to many advanced technologies, including but not limited to advanced metal alloys and ceramics, sputter targets, semiconductors, optics, medical devices, pharmaceuticals, batteries, sensors, catalysts, in additive manufacturing, in electronics, in aerospace, in nuclear energy industry, and in quantum computing. The success of these technologies and industries relies on the high purity feedstock (e.g., 99.995% + purity) and contamination-free processing and engineering.

Facts

- Real materials are not pure! They contain various impurities.
- Impurities introduce new energy levels and defects to materials, leading to desired and/or unintended changes in materials chemistry and physical properties.
- Contamination is often thermodynamically and kinetically favorable.
- Distribution of impurities is driven by a variety of mechanisms, including sorption, dissolution, diffusion, segregation, precipitation, and trapping.

Impurity Roles and Classification

Impurities play a variety of roles, affecting the performance, the reliability and the lifetime of many materials, parts and devices, particularly under dynamic load, extreme environment or harsh conditions.

- Nuclear impurities – neutron absorbers, moderators, and reflectors
- Electronic impurities – dopants, deep trappers, and recombination centers
- Optical impurities – absorbers, scattering centers, and chromophores

From feedstock to field failure, purity matters through the entire product lifecycle!

- Chemical impurities – catalysts, poisoners and inhibitors in conventional chemistry, biochemistry and electrochemistry
- Structural impurities in engineering materials – low melting point phases, sintering aids, inclusions, strengtheners, grain refiners, and grain boundary binders
- Nucleation seeds during crystal growth
Why Choose EAG Laboratories for Trace and Purity Analysis?

EAG Laboratories has been a trusted, long-standing partner in high technology industries. Over the past three decades, we have established a full suite of trace analysis services that feature advanced analytical techniques, a comprehensive reference material database, highly educated staff leveraging scientific expertise for problem solving, and a rigorous data security and IP confidentiality practice.

Quality

EAG Laboratories implements a quality management system, allowing for traceable and transparent development protocols.

- Nadcap
- ASTM, USP and ISO standard testing methods
- DLA suitability for MIL-STD 883/750

Global Support

As the global leader in materials and engineering sciences, EAG supports thousands of clients with 20+ facilities located in the US, Europe and Asia.

EAG is the leading GDMS service provider. We have 25 high-mass resolution GDMS instruments installed globally to provide uninterrupted purity certification services.

Comprehensive Trace Analysis Services

Our trace analysis capability includes both Direct Solid Sampling and Solution Sampling techniques. In addition, EAG offers diverse outgassing analysis services. These techniques are used for production support, R&D, failure analysis and litigation support.

- Full survey trace analysis and purity certification of high purity solids and liquids (70+ elements)
- High performance ICP-OES analysis for accurate composition determination
- Depth specific impurity distribution measurement in thin films and coatings
- 2D- and 3D-mapping of impurities in solids
- Outgassing analysis and thermal analysis
- Gas analysis in hermetic devices (e.g., medical implants)
- Reference material development
Ranked by suitability:
1 - 1st choice
2 - alternative choice
3 - complementary
4 - case by case

Elemental Analysis
- EDS
- ETV-ICP-OES
- GDMS
- ICP-MS
- ICP-OES
- IGA
- LA-ICP-MS
- LIBS
- CHLD
- DIP-MS
- EGA
- RGA
- TGA/IRMS
- Protonix
- SEM
- TGA
- DSC
- TDS

Molecular Outgassing Analysis
- Gas Analysis & Leak Detection in Hermetic Package with DLA suitability
- Evolved Gas Analysis under High Vacuum (up to 1200°C)
- Evolved Gas Analysis in inert, moisture, oxidizing and reducing atm. (up to 1400°C)
- Direct Gas Analysis

Surface Textures
- 2D and 3D Element Distribution Mapping (Li - U, 0.5 µg/g - %mass)
- Leaching and Extraction
- RoHS Compliance
- Specification - Batch Quality Control / Comparison
- Gas Analysis & Leak Detection in Hermetic Package with DLA suitability
- Evolved Gas Analysis under High Vacuum (up to 1200°C)
- Evolved Gas Analysis in inert, moisture, oxidizing and reducing atm. (up to 1400°C)
- Direct Gas Analysis

Thermal Analysis
- Glass Transition, melting/incipient melting, and other phase transformation (-90 to 1500°C)
- Thermal Decomposition / Thermal Stability / Accelerated Aging
- Loss on Ignition / Loss on Drying (moisture contents)
- BET Surface Area / Pore Size Distribution
- Surface Roughness

Scientific Support
- Materials - and/or process - related problem solving
- Litigation Support
- Failure Analysis (surface contaminants, material ID, H embrittlement, corrosion)

Our complete list of instrumentation can be found at eag.com/techniques.