

NUCLEAR INDUSTRY

APPLICATION SOLUTIONS FOR THE FUEL CYCLE, REACTOR &
STRUCTURAL MATERIALS, AND WASTE, RECYCLING & DECOMMISSIONING



DISCOVER MORE



FUEL CYCLE & FUEL FABRICATION



REACTOR & STRUCTURAL MATERIALS



WASTE, RECYCLING & DECOMMISSIONING

COMPLEMENTARY TECHNOLOGIES FOR NUCLEAR MATERIALS

PARTICLE CHARACTERIZATION AND SAMPLE PREPARATION



ELEMENTAL ANALYSIS



- | Oxygen, nitrogen and hydrogen analysis of uranium feed materials and fuel fabrication products to verify purity and process consistency.
- | Oxygen and hydrogen determination in zirconium alloys and fuel assembly components to support quality assurance for nuclear-grade components.

- | Oxygen, nitrogen and hydrogen analysis of zircaloy and nickel alloys to assess material integrity, hydrogen pickup and embrittlement risks.
- | Carbon and sulfur determination in structural alloys and nuclear graphite for material qualification.
- | Elemental analysis of carbon, sulfur, oxygen, nitrogen and hydrogen (C/S/O/N/H) in fusion reactor materials, including tritium breeder materials and plasma-facing components, to support material alification and tritium inventory management in fusion energy research.

- | Thermogravimetric analysis (TGA) for moisture, ash and loss-on-ignition of waste conditioning materials and decommissioning samples.
- | Elemental analysis supporting characterization of contaminated materials prior to recycling, storage or disposal.



HEAT TREATMENT



- | Controlled-atmosphere sintering of UO_2 and MOX fuel pellets to achieve reproducible density, microstructure and fuel quality.
- | High-temperature thermal processing for TRISO fuel production, including heat treatment and sintering steps for fuel kernels and ceramic coating materials used in advanced reactor and SMR fuel technologies.
- | Calcination and thermal treatment of uranium-based powders for fuel preparation and process optimization.

- | High-temperature processing, annealing and stress relieving of reactor materials, graphite and advanced nuclear ceramics.
- | Vacuum and controlled-atmosphere furnaces supporting qualification of structural materials for demanding nuclear applications.
- | Pyrolysis of nuclear-grade carbon materials for neutron-moderator applications.
- | Glovebox interfacing for handling hazardous materials as well as equipment optimization for systems operating wholly inside a glovebox.

- | Dedicated furnace systems for carbon-14 and tritium extraction from irradiated graphite and decommissioning materials.
- | Scale-up systems for tritium recovery in fusion reactors.
- | Thermal treatment, ashing and residue determination supporting waste characterization and conditioning studies.



MATERIALOGRAPHY & HARDNESS TESTING



- | Metallographic preparation and hardness testing of cladding tubes and welds to verify microstructure, mechanical properties and manufacturing quality.
- | Sample preparation and material testing to support qualification of nuclear fuel components throughout production.

- | Microstructure evaluation, hardness testing and weld inspection of reactor steels, zircaloy and structural alloys to assess material integrity.
- | Remote operation of hardness testers and metallographic equipment in hot-cell environments, with instrument control from a computer located outside the hot cell in the safety area.

- | Metallographic characterization of irradiated structural materials and decommissioned components for material verification and failure analysis.
- | Remote sample preparation and hardness testing of radioactive materials in hot-cell environments, reducing operator intervention while enabling instrument control from the safety area.



PARTICLE CHARACTERIZATION



- | Analysis of particle size, shape, surface area, porosity and density can support the characterization of nuclear powders, ceramics, graphite and waste-related materials across research, production and quality control.

Techniques:

- | PARTICLE SIZE & SHAPE
- | BET SURFACE AREA
- | POROSITY
- | DENSITY



MILLING & SIEVING



- | Milling, homogenization and sieving can support the preparation of representative nuclear-material samples for reliable downstream chemical analysis, particle characterization and microstructural analysis.

Techniques:

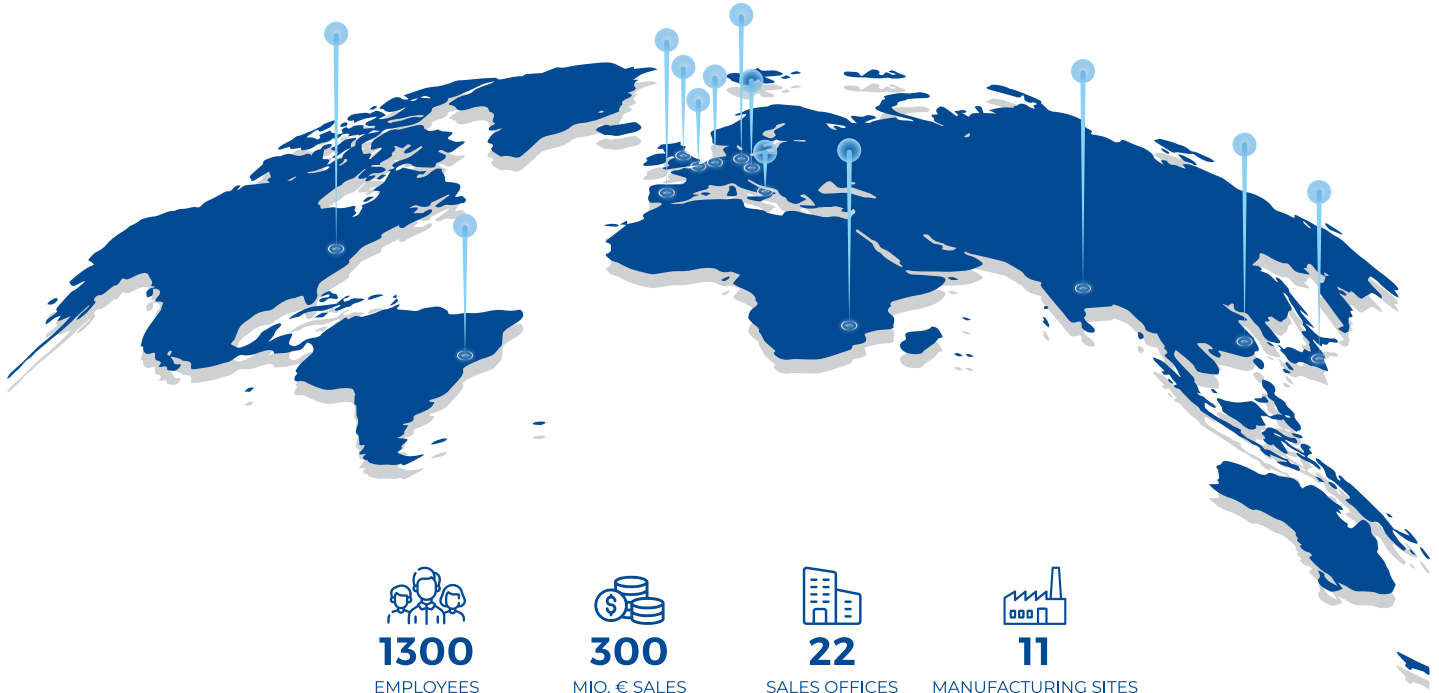
- | MILLING
- | HOMOGENIZATION
- | SIEVING



NUCLEAR APPLICATIONS

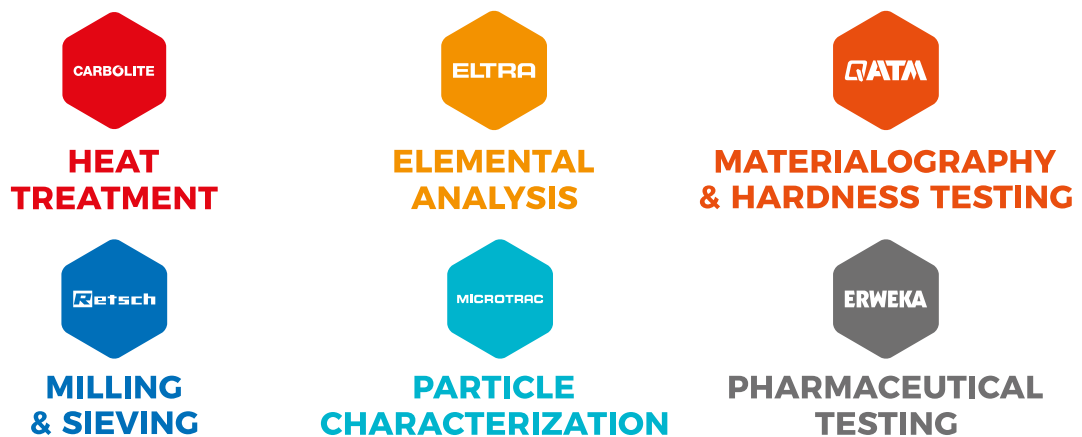
NUCLEAR MATERIALS CHARACTERIZATION
UNDERSTANDING COMPOSITION,
STRUCTURE AND BEHAVIOR AT EVERY STAGE

ENABLING PROGRESS



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GLOBAL REACH, LOCAL EXPERTISE



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