

11. MICROSTRUCTURE LABORATORY

Name of the infrastructure	Microstructure Laboratory
Location of infrastructure (town, country)	Madrid, Spain
Web site address	http://rdgroups.ciemat.es/web/materiales/microstructure-laboratory
Legal name of organization operating the infrastructure	CIEMAT, Centro de Investigaciones Energéticas Mediambientales y Tecnológicas
Location of organization (town, country)	Madrid, Spain
Key Accelerator Research Area(s)	Surface characterization, SEM, TEM, XPS, Auger Spectroscopy
General description of the infrastructure	<p>This facility is composed by the following infrastructures:</p> <p>1. Scanning electron microscopy (SEM):</p> <ul style="list-style-type: none"> - The scanning electron microscope (SEM) allows the obtention of high-resolution images by means of an electron beam focused on the sample to be studied, scanning its surface. <p>2. Scanning electron microscopy (FEGSTEM-EDX, BSE, EBDS):</p> <ul style="list-style-type: none"> - Schottky Field Emission Gun (FEG) - Accelerating voltage up until 30 kV - Magnification: 10x-100000x - Resolution with Se: 1.2 nm - Resolution with BSE: 3.5 nm <p>3. Scanning Auger microprobe:</p> <ul style="list-style-type: none"> - Scanning Auger Microprobe, including in-situ fracture studies, one by impact (cooling of the specimen at liquid nitrogen temperature) and the other by tension. <p>4. X-ray photoelectron spectroscopy (XPS/ESCA):</p> <p>5. Transmission electron microscope (TEM) JEOL JEM 2010:</p> <ul style="list-style-type: none"> - Transmission electron microscopy is a powerful technique that uses an electron beam that is transmitted through a solid (an ultra-fine sample, about 100 nm) to form an image. This technique gives information about the microstructure and morphology of the samples studied. <p>6. TEM sample preparation laboratory:</p> <ul style="list-style-type: none"> - Sample preparation is an important aspect of TEM analysis, as a TEM sample must be fine enough for electrons to pass through it and form an image. - The samples go through several processes of cutting, smoothing, and polishing to achieve electronic transparency.
Already existing or planned	Facility in user operation since 1980
Unique features	Facility for microstructural characterization and microanalysis (surface analysis) in radioactive installation.
Present situation/future changes/expected lifetime	In operation for several years. No large change presently planned.
Accelerator infrastructure or component test infrastructure	Component test infrastructure
Shared facility/infrastructure	Infrastructure dedicated to R&D and projects
Main user community	Nuclear Materials and Metallic Materials for Energy Sector.
Open for external users	Yes
If open to external users: Modality of access to the infrastructure (access unit)	Contracts or agreements for services (research and development and innovation activities)
Number of access units available for external users	Depending on the availability of the part of the installation needed
If open to external users: Support offered by the organization operating the infrastructure	Support will be provided by CIEMAT, at a cost: manpower for preparing the tests, assembly, running of the installation, fluids, and electricity... In any case, the presence of some users will be requested at some points
Review procedure for requested access	Either after discussion with CIEMAT, or in the frame of an international contract, European or else
How to apply	By contracting the Division leader at CIEMAT
Can the infrastructure be made available?	Yes
If YES, fraction of time that could be made available (%)	Depending on the internal projects going on, and on the facility needed, a priori around 20 %
Number of FTEs operating the infrastructure	3

Contact details (name, Institute, email,)	Gonzalo de Diego Velasco Head of Microstructural Characterization and Microanalysis Unit Avenida Complutense, 40 28040, Madrid g.diego@ciemat.es Tel.: +34 91 346 6618
if available: costing model (how is the annual operating cost calculated)	If service is delivered to internal CIEMAT clients, costs are calculated on a basis of an all-in fee package. Special conditions may be applicable for tests performed in the frame of approved official cooperation agreements.

Pictures

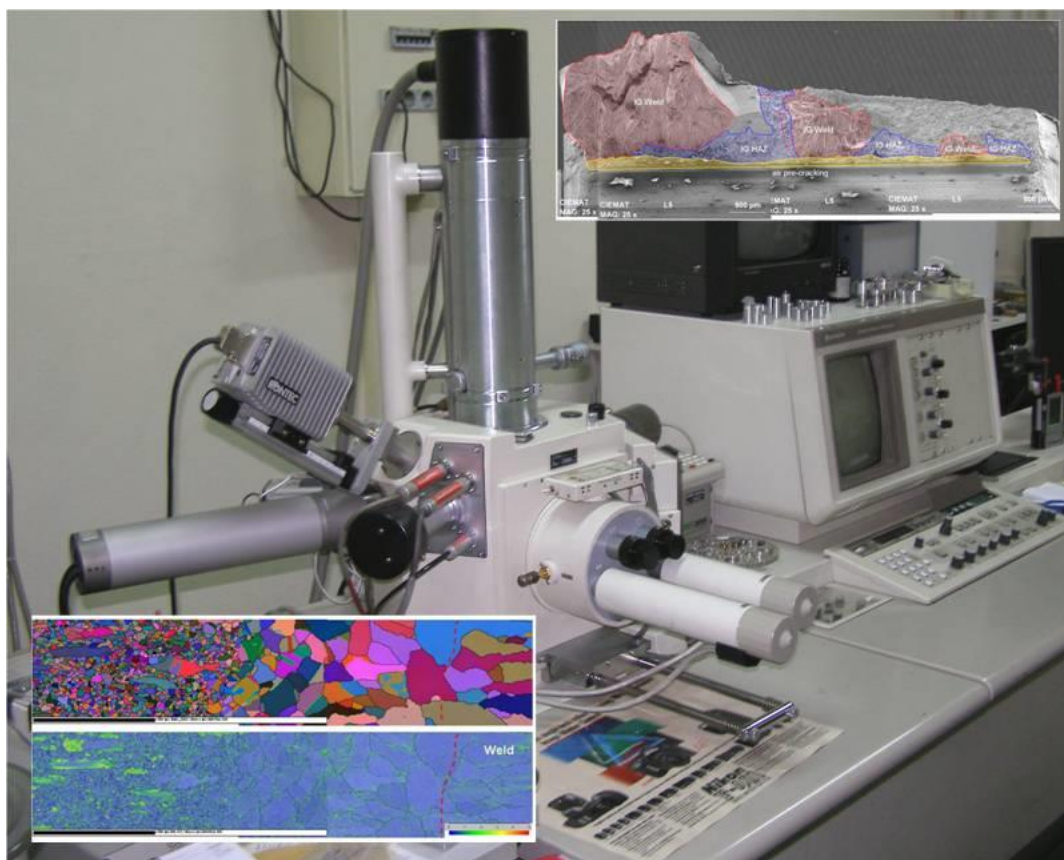


Fig. 20. Scanning electron microscopy (FEGSTEM-EDX, BSE, EBDS)