Ore Processing and Enrichment Unit

- Falkon (Denver tip)
- Russell Type Drum Screening Machine
- Manual Jones Rifle Type Separator
- Tiltable Ball and Bar Mill
- Wet Concentration Table Wilfley Type
- Falcon Semi-Bulk Gravity Separator (Concentrator)
- Multiple Gravity Separator (Mozley Type)
- Laboratory High Field Intensity Wet Welded Magnetic Separator
- Laboratory Low Density Wet Magnetic Separator
- Laboratory Low Field Density Dry Magnetic Separator
- Three Piston Jig
- Knelson Gravity Concentrator
- Mixer horse



MUNZUR ÜNİVERSİTESİ

Bilimde Öncü, Düşüncede Özgür, Fikirde Özgün"

2008

MUNZUR UNIVERSITY

"Leader in Science, Free in Thought, Unique in Idea"

Munzur University Outreach Programme

Rare Earth Elements Application and Research Center





ISO 17025

ISO 9001

Physical and Chemical Characterization Unit

- Focused ion beam scanning electron microscopy (FIB-SEM) enables imaging of nanoscale structures of materials.
- Laser Headed High Resolution Inductively Coupled Plasma Mass Spectrometer (LA-HR-ICP-MS) provides the opportunity for chemical analysis directly from solid ore samples. It is used in isotope and age determination analyses.
- ICP-OES for chemical analysis of ores, concentrates or wastes
- XRF is used in the chemical analysis of ores, oxides and ores, concentrates and wastes.
- Grain size analyzer is used in grain size analysis of ores.
- Dynamic Mechanical Analysis (DMA) is used in the analysis of mechanical properties of materials.
- Differential Scanning Calorimetry (DSC) in thermal analysis of materials
- Ultraviolet and visible light absorption spectroscopy (UV-VIS-NIR)rünür ışık absorpsiyon spektroskopi (UV-VIS-NIR)



Material Production Unit

- Spark Plasma Sintering System
- High Vacuum and Heat Treatment Furnaces
- Thermal Evaporation and Magnetron Sputtering Systems
- Glove Box Systems for magnet production
- Micro Injection Machine
- Cold Isostatic Press (CIP)
- Bed Jet Mill and Classifier
- Arc Melting and Spinner
- magnetizer
- Twin Screw ExtruderBall Milling
- Precision Cutting Machine
- Automatic Assembly Press
- Electrospin System
- High Pressure Reactor










High value added products to be produced at MUNTEAM

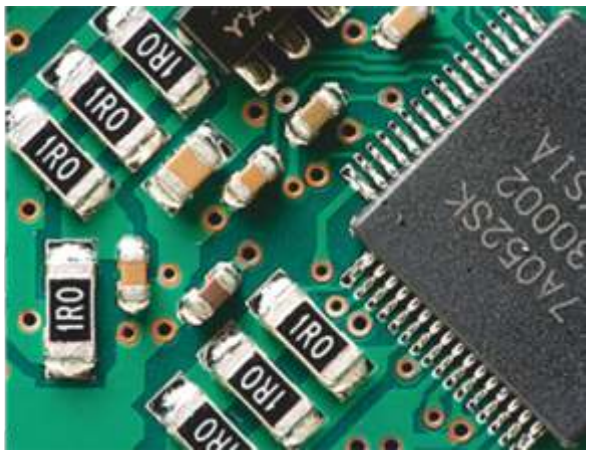
Metal alloys containing REE

Composite materials containing REE

Optoelectronic materials containing NTE

Production of NdFeB magnets

With the R&D studies to be carried out in the MUNTEAM Laboratory, it is aimed to develop the use of NTE-based high value-added products in renewable energy, electric vehicles, digital technology, biomedical, aviation and space technologies.

Contact Information and MUNTEAM Responsible Operating within the Revolving Fund of Munzur University

Dr. Lecturer Member Ceren ERÜST ÜNAL

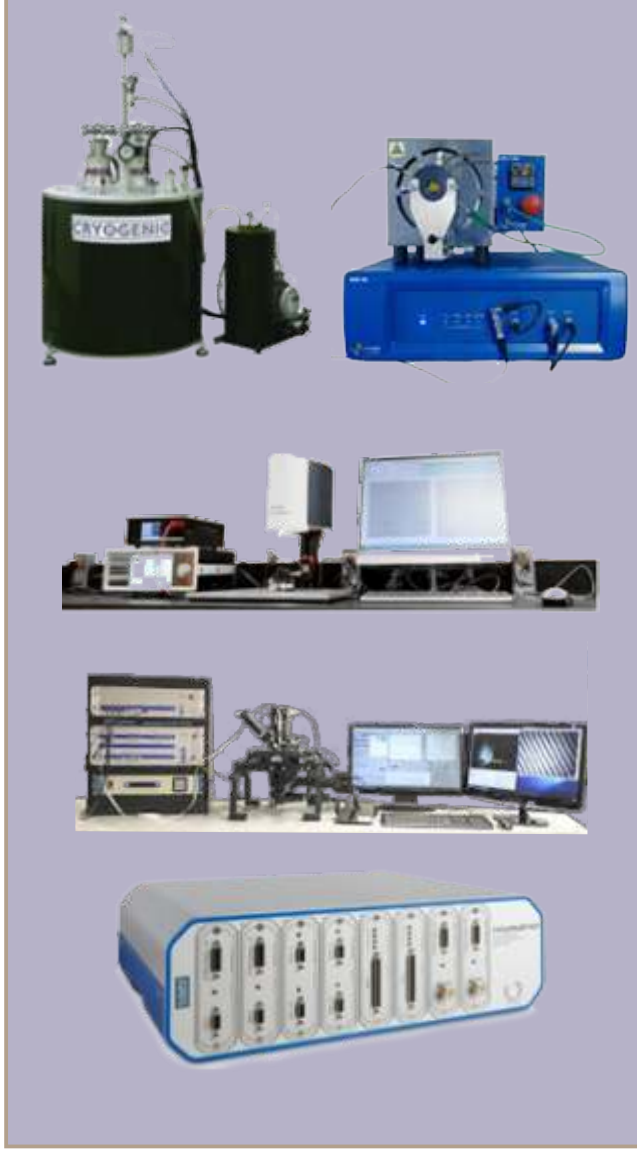
cerenerustunal@munzur.edu.tr

Contact: (0 530) 655 00 62

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Material Characterization Unit

- Vibrating Sample Magnetometer (VSM)
- X-ray Photoelectron Spectroscopy (XPS) System
- Electrical Characterization of High Impedance Solid Materials
- Scanning Electrochemical Probe System
- Melt Flow Index
- Solar Simulator System
- Multi-Channel Bipotentiostat system
- High Impedance Electrochemical Potentiostat system
- 3D Interferometric Profilometry



Research Laboratories

Aukaplama, SEM-EDX and Xrd devices within Tunceli Vocational School operate in the revolving fund service.

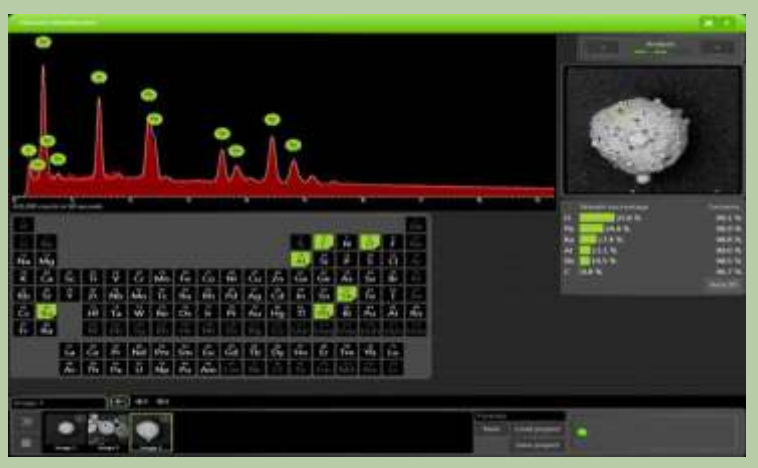
- Gold (Au) Plating Device
- For the analysis of insulator samples for which SEM imaging is required, revolving fund service is offered with the SBC-900-C gold plating device working under vacuum to be used in sample preparation.



SEM-EDX
(Scanning Electron Microscope-Energy Dispersive X-Ray Spectroscopy)

- Scanning electron microscope or SEM (scanning electron microscope) is a type of electron microscope that obtains images by scanning the sample surface with a focused electron beam. Electrons interact with atoms in the sample, producing different signals that contain information about the topography and composition on the sample surface. These signals are collected by the relevant detectors and transferred to the computer screen and an image is obtained.
- There is a Hitachi Su3500 brand SEM device in the SEM section of the materials laboratory. With the device, a designated point, line and area scanning and selected area X-ray mapping are performed with the EDX system, and qualitative and quantitative element analyzes can be performed in these areas.
- EDX can be used to perform both quantitative and qualitative analysis, determining which elements are present on the sample being examined and the chemical concentration ratios of these elements. Additionally, it can be performed during traditional SEM analyses, does not damage the sample or the sample surface, and does not require a separate sample preparation process.
- Due to its many advantages, EDX analysis is widely used in the industry, from production processes to quality control processes.





XRD (X-Ray Diffraction device)

- X-ray diffraction device is the easiest and most powerful device that can be used to examine the crystal structure of solids, and is one of the most suitable methods for explaining the interatomic order due to X-ray diffraction and the wavelength of X-rays. It is used to identify an unknown material or to determine the structure of a known material at atomic dimensions. Qualitative material research, characterization and quality control can be carried out with the RIGAKU brand Miniflex 600 device in our laboratory. Qualitative and quantitative examinations of rocks, crystalline materials, thin films and polymers can be made with the X-Ray Diffraction device.



Contact Information and Responsible of the Research Laboratory

Operating within the Revolving Fund of Munzur University

Lecturer See. Tarık BAYDAR

tarıkbaydar@munzur.edu.tr

Contact: (0428) 213 17 94 (Ext: 1807)•(0 530) 655 00 62

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- **FTIR spectroscopy**

Fourier Transform Infrared (FTIR) Spectroscopy is basically based on the absorption of infrared light by the substance under examination through the vibration and rotational movements of the bonds. It is checked how much of the light transmitted to the sample is absorbed at a certain energy. The energy at which a signal (band) is obtained in the absorption spectrum gives the vibration frequency of the sample molecule. IR spectroscopy enables substance analysis at the molecular level by using the characteristic frequency values caused by the vibrations of the IR beam on the molecules. These vibration patterns may differ depending on the bond angle (shear, oscillation, buckling, etc.) and length (symmetrical and asymmetrical tension), and these differences are reflected in the frequency values.





- **This phenomenon is only observed in polar molecules with dipole moments. With the ATR, attenuated total reflection unit, direct IR spectra are obtained without the need for KBr pellet preparation. With the diamond crystals used in the ATR unit, higher resolution IR spectra of different types of samples can be obtained. In this analysis method, rapid results are obtained without damaging the sample.**

Usage areas

- **FTIR spectroscopy is a method used to quickly and precisely detect compounds such as all kinds of organic and inorganic substances, plastics, polymers, blends, fillers, paints, rubber and coatings.**

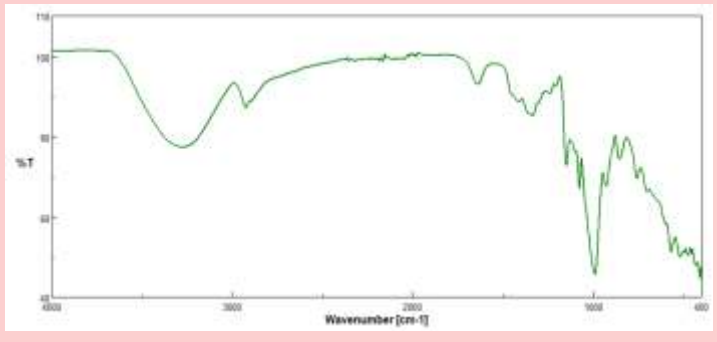
Sample Properties

- **Samples to be sent for analysis may be in powder, film, coating or liquid form. It should be between 50-100 mg in powder samples. For liquid samples, it should be between 1-3 ml. Analysis can be done at 400-4000 wavelengths.**

The information to be obtained as a result of FTIR analysis is;

- **Determination of intramolecular bonds**
- **Information about intramolecular functional groups**
- **Information about molecular structure**





Contact Information and Research Laboratory Supervisor Operating Within the Revolving Fund of Munzur University

Assoc. Dr. Nedim GÜRLER

nedimgurler@munzur.edu.tr

Contact: 05377354824

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- **TG/DTA: Thermogravimetric Analysis and Differential Thermal analysis**
- **TGA Analysis: Provides information about the mass losses occurring in the sample due to the effect of heat.**
- **DTA Analysis: Along with TGA analysis, it provides information about the phase change occurring in the sample or the energy changes resulting from the chemical reaction.**
- **Analyzes Performed: TGA-DTA analysis (max. 1.100 °C, sample amount should be >10 mg)**



Contact Information and Responsible of the Research Laboratory Operating within the Revolving Fund of Munzur University

Prof. Dr. Ragıp ADIGÜZEL – Assoc. Dr. Yeliz İPEK

radiguzel@munzur.edu.tr

Contact:05063154280

Click here for fee information...