

MODERN INVESTIGATION OF MINERALS AND INDUSTRIAL MATERIALS

In the material analysis workshop of the University of Miskolc equipped with unique instrumental capabilities the researchers and didactic staff have the possibility of complex investigations of minerals and industrial materials, such as rocks, raw materials, processed mineral products, wastes and byproducts, modern and archaeological materials.



SERVICES

X-RAY POWDER DIFFRACTION

- Crystal structure based mineralogical investigations
- Quantitative mineralogical composition and crystal structure refinement
- Non-destructive investigation of material surfaces

CHEMICAL COMPOSITION ANALYSIS WITH XRF METHOD

- Chemical analysis by X-ray fluorescence spectrometry
- Investigation of powder samples and fused glass pellets

OPTICAL AND ELECTRON OPTICAL LABORATORY

- Polarizing light microscopy
- Scanning electron microscopy and chemical analysis

SAMPLE PREPARATION

- Cutting of large (up to 30x30x30 cm) rock blocks
- Precision sample cutting
- Polished slabs and thin sections with vacuum embedding in epoxy resin
- Powder sample preparation with high frequency vibrational ball mill (<0.02 mm)
- Separation by centrifuging
- Heavy mineral separation in polystyrene media

3D LABORATORY

- The integrated 3D laboratory allows the 3D analysis in the nanoscale domain for almost any type of material
- Quantitative structural and compositional data is offered by four main instruments in complementary operation

- electron beam microanalysis with WDX and EDX spectrometers: Jeol JXA-8600 Superprobe
- X-ray powder diffractometers: Bruker D8 Advance and Bruker D8 Discover
- Schottky field emission gun equipped Thermo Scientific Helios G4 PFIB CXe scanning electron microscope
- Rigaku Supermini XRF instrument



INSTRUMENTS

- „ Fundamental research into the exploitation of the economic development potentials of critical raw materials in international co-operation” CriticEI (TÁMOP-4.2.2.A-11/1/KONV-2012-0005) (<http://kritikuselemek.uni-miskolc.hu/>)

- UNEXMIN <https://www.unexmin.eu/>

- REEBAUX <http://reebaux.gfz.hr/>

- RING 2017 – *Tematic network for sustainable raw material management* (EFOP-3.6.2-16-201700010) <https://ring2017.uni-miskolc.hu/>

- Stockwork Ltd. (Romania): *Mineralogical investigation of ore samples (2015)*

- RAG-Hungary Ltd. (Hungary): *Petrographical and sedimentological analysis of the Kiha-003 well (2015)*

- Geoprodukt Ltd. (Hungary): *Investigation of zeolitic tuffs from Mád (2016)*

- Boliden Mineral AB (Sweden): *Analysis of ore samples from Aitik North, XRPD phase identification with Rietveld refinement (2017)*

- PT J Resources Nusantara (Indonesia): *Quantitative mineralogical investigation by Rietveld-refinement on X-ray Powder Diffraction data (2017)*



REFERENCES