



Laboratory of innovative fine grinding and particle technology

I. Location of the laboratory:

Research, Education and Innovation Centre of Earth and Environmental Science
University of Miskolc building C/2 hall 1, room 114.

II. Operating institute of the laboratory:

Institute of Raw Material Preparation and Environmental Technology

III. Scientific head of the laboratory:

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IV. Responsible researcher/person:

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V. The aims and tasks of the laboratory on the education, scientific and research fields:

In accordance with the field of research, the main research tasks include the development of innovative fine grinding and particle design technologies. The equipment in the laboratory provides the opportunity to produce ground materials with special properties and high fineness and to test them with today's most modern technology. The purpose of the laboratory is to provide the analytical background necessary for particle design, and to realize the production and analysis of products with high added value.

The educational tasks of the laboratory: demonstration and measurement exercises on the above topics, as well as scientific student work and thesis, or ensuring the preparation of a diploma thesis and a PhD dissertation within the framework of university-level undergraduate (B.Sc.), master's (M.Sc.), doctoral (PhD), and other education courses.



VI. Laboratory experiments, services (on-site experiment is possible):

- BET specific surface area measurement.
- Examination of the morphology and chemical composition of granular materials - SEM and EDX.
- Production of fine and ultrafine ground materials in a planetary mill.
- Determination of the flow properties of powders with shear cell and also in dynamic conditions and under fluidization.
- Silo dimensioning.
- Determination of particle size and shape distribution.

VII. Available equipment for education, research, and innovation

- Retsch Technology Camsizer X2 dynamic image analyzer for particle size and shape measurement. With dry (XJet) and wet (X-Flow) dispersing unit.
- Freeman Technology FT4 Powder flow properties test equipment.
- Micromeritics Gemini 2390t – BET specific surface area measuring equipment.
- Phenom ProX desktop scanning electron microscope.
- Fritsch Pulverisette 5 Premium line planetary mill with high energy density.
- EDEM – DEM software suitable for modelling granular materials.
- TAM AIR 3 isothermal calorimeter.

VIII. Laboratory development plan, requirements:

The equipment in the laboratory was acquired in the last 5 years and complements the existing infrastructure in the Institute of Raw Materials Preparation and Environmental Process Technology and the other laboratories of the institution (ME). In this way, an equipment park providing modern material production and testing conditions was created, with which we can research the relationships between the production conditions of micronized and nanonized materials and their material characteristics in a complex way.

IX. Main professional partners / references:

Our laboratory has cooperated with several domestic and international partners in the past and is currently cooperating, among which we mention the following partners as a reference:

- CEMKUT Kft.
- KisChemicals Kft.
- KisAnalitika Kft.

X. Compiler of the information material:

Ádám Rác



Micromeritics Gemini 2390t – BET,

Miskolc, 19 June 2024