Laboratory of Nanoprocessing

I. Location of the laboratory:

Research, Education and Innovation Centre of Earth and Environmental Science
University of Miskolc building C/2 hall 1, 102.

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:
The main research task of the laboratory is the investigation of material transformation processes, which take place in the submicron- and nano-size range. Especially the laboratory is focused on the production of nanoscale materials by nano-grinding, mechanical activation of materials, measurement of the physical and structural characteristics of submicron disperse systems.
Educational aim of the laboratory: demonstration and laboratory measurement of practical courses in the above-mentioned topics, as well as to support the student research work for diploma theses in B.Sc. and M.Sc. level, as well as PhD dissertations. It serves also the educational courses for practising engineers.

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

- Determination of the particle size distribution:

  -with HORIBA LA-950V2 laser particle size analyzer in the range of 10 nm…3 mm,

  - with micro sieves, in a range of 5…50 µm.

- Optical microscopy, static image analysis.
- Production of colloid disperse systems with stirred media mills (nano grinding).
- Identification of various plastics (PA, PVC, PUR,…).
- Determination of main material components by FTIR.
- Determination of specific surface area with Blaine-equipment.

VII. Available equipment for education, research and innovation

- NETZSCH MiniCer stirred media mill with continuous operation for submicron and nanoscale particle production.
- HORIBA LA-950V2 laser particle size analyzer, able to measure the particle size distributions of drops in emulsion and particles in suspension in a range of 10 nm...3mm.
- Zeiss AXIO M2m optical microscope, 20 50 és 100X magnification objectives with PC (for digital image analysis).
- Jasco Fourier Transformed Infrared Spectrometer.
- Fritsch Analysette 03 precision micro-sieves (5, 10, 20, 25, 30, 35, 40, 50 µm) and sieving machine.
- Blaine- and Griffin-type specific surface area measurers.
- Ultrasonic bath – Fritsch laborette 17.002.

VIII. Main professional partners / references:

- KIS Chemicals Ltd.
- Cemkut Ltd.
- National Metallurgical Laboratory, India

IX. Compiler of the information material:

Retsch Technology Camsizer, Freeman Technology FT4

HORIBA LA-950V2 laser particle size analyzer, NETZSCH MiniCer stirred media mill

Ádám Rácz

Miskolc, 19 June 2024