

COURSE TITLE:

OPTICAL PARTICLE SIZING

COURSE DESCRIPTION:

Particle sizing and characterization is an essential for earth and environmental sciences but these techniques are used by petrochemical industry and pharmaceutical industry, as well. This course deals with the most important optical techniques (such as laser diffraction, SLS and DLS, image analysis, etc...) with brief theoretical overview with different kinds of applications:

1. Theory: traditional particle sizing (sieving, settling); optical techniques: Mie-theory, Fraunhofer approximation, dispersion techniques, laser diffraction, dynamic light scattering; image analysis;
2. Sampling and sample preparation: general application - ISO procedures. Pre treatment for soil and sediment samples: MSZ (Hungarian Standard); Wageningen, USDA and FAO procedures;
3. Sizing of particles and agglomerates by Laser diffraction particle sizer: techniques for non-moving cell instruments. Measurement of pretreated materials.
4. Sizing of particles and agglomerates by Laser diffraction particle sizer: techniques for moving cell dual-laser instruments. Measurement of pretreated materials.
5. Image analyser: dry dispersion of powders. Image analysis a technique for thin sections.
6. Particle sizing of nanoparticles: DLS and SLS techniques. Determining of molecular size. Estimation of molecular weight, How to measure zeta potential. Determination of IEP.

LITERATURE:

- Bruce J. Berne, Robert Pecora 2000: Dynamic Light Scattering: With Applications to Chemistry, Biology, and Physics. Wiley, New York
- James P. M. Syvitski 1997. Principles, Methods and Application of Particle Size Analysis. Cambridge University Press, Cambridge
- Martin Konert, Jef Vandenberghe 1997. Comparison of laser grain size analysis with pipette and sieve analysis: a solution for the underestimation of the clay fraction. SEDIMENTOLOGY 44. 523-535.

TEACHER:

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