Analytical Methods in Colloidal Sciences

Prof. Dr. Bernd Smarsly
Institute of Physical Chemistry
Justus-Liebig-Universität Gießen

22-23 May 2023
8 hours (see time schedule below)
as a part of the course “Chimica dei Colloidi” but open to all
Dipartimento di Scienze Chimiche

Content of the teaching program: The course is part of the “ Colloid chemistry” course of Prof. Silvia Gross. In the part of Prof. Smarsly, colloidal analytics will be dealt with, focussing on three main methods to determine the size of nanometer-sized particles in dispersions, which are dynamic light scattering, ultracentrifugation and x-ray diffraction.

1) X-ray Diffraction for the determination of particle sizes of nanocrystalline materials

- Basics of X-Ray Diffraction (Bragg Law)
- Effect of small particle sizes on XRD profiles, and determination of particle sizes thereof (Scherrer equation)

2) Dynamic Light Scattering (DLS)

- Basics (Diffusion, Einstein-Smoluchowski equation)
- Principle of extraction particle sizes from DLS data

3) Ultracentrifugation

- Basics of sedimentation (quantitative treatment on the basis of the corresponding equations)
- Discussion of examples in regard to sedimentation in general
- Examples for ultracentrifugation as analytical method.

Timetable:
Monday 22 May 2023 (3 h)
12.30-13.15 AULA P
16.30-18.15 AULA M
Tuesday 23 May 2023
14.30-16.15 AULA M
Wednesday 24 May 2023 (3 h)
8.30-11.15 AULA N

A certificate will be provided upon 75% of attendance

Prof.ssa Silvia Gross
Dipartimento di Scienze Chimiche