Dispersions of nanoparticles and macromolecules: basic features and characterization with scattering techniques (KDIT117)

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Week 1: Classification of nanomaterials and macromolecules by their origin, structure and shape

Week 2: Methods for preparation of nano-sized organic and inorganic materials

Week 3: Static light scattering I: electromagnetic radiation and its interaction with matter

Week 4: Static light scattering II: theories and their application in dispersions

Week 5: Static light scattering III: determination of molecular mass and radius of gyration

Week 6: Dynamic light scattering I: Brownian motion, intensity fluctuation and correlation

Week 7: Dynamic light scattering II: Stokes-Einstein relation and size distribution

Week 8: Dynamic light scattering III: effects of light absortion and interparticle interaction

Week 9: Dynamic light scattering IV: determination of hydrodynamic radius and polydispersity

Week 10: Electrophoretic light scattering I: the basis of the Laser Doppler Velocimetry method

Week 11: Electrophoretic light scattering II: frequency and phase analysis of the scattered light

Week 12: Electrophoretic light scattering III: electrophoretic mobility and zeta potential

Week 13: Small angle X-ray scattering I: X-Ray radiation and its interaction with matter

Week 14: Small angle X-ray scattering II: theories and applications in nanostructured systems

Literature:

1. P. Lindner, T. Zemb: Neutrons, X-rays and Light: Scattering Methods Applied to Soft Matter
2. B.J. Berne, R. Pecora: Dynamic Light Scattering
3. L.A. Feigin, D.I. Svergun: Structure Analysis by Small-Angle X-Ray and Neutron Scattering