COST D43: Colloid and Interface Chemistry for Nanotechnology

Program Workgroup 2: Synthesis and Availability of Reference Materials

Target of the WG activities

The scope of research is to synthesize nanostructured reference materials of well-defined size and functionalities available through a database, and with the aim of their later commercialization. Fabrication of nanoscale objects is possible only with materials that have well-defined properties on this length scale. For this reason, the availability of well-characterized reference materials is indispensable. Since then, many approaches have been developed to obtain very uniform inorganic and organic particles with well-defined shapes and morphology. Based on such approaches, one will be able to synthesize well-defined reference particle standards (for example, metals, oxides, sulfides, latex). A further important class of reference materials include highly purified surfactants or aggregating polymers that can be used to obtain micelles, reversed micelles, liquid crystals, microemulsion droplets, or vesicles in a reproducible fashion. Finally, reference solid surfaces with well-defined roughness, surface layer coatings, and functionalities are necessary. The workgroup will therefore focus on the compilation and/or synthesis of such reference materials, and on making them available through a corresponding database, and on providing the basis for later commercialization of such materials. Companies specializing in reference nanoscale materials are very profitable in the US but scarce in Europe. Thus, the workgroup will promote the transfer of the excellent know-how in this area from academia to the private sector in Europe. The characterization of these materials will be based on the results of Workgroup 1, according to criteria such as particle-size distribution, morphology, layer thickness, charge, surface homogeneity, chemical and optical properties.

Research Topics

1. Metal Nanoparticles: synthesis, characterization, modeling, attachment to organized films.
2. Semiconductor Nanoparticles: synthesis, characterization, growth kinetics, modeling, incorporation in matrixes.
3. Metal Oxide Nanoparticles: synthesis, characterization, coatings, incorporation in matrixes, catalytic activity.
4. Nanoparticle Arrays: building up of ordered 2D and 3D arrays of nanoparticles, superlattices, and characterization.
5. Assemblies Of Nanoparticles, Surfactants And Polymers
6. Solid/Liquid Interfaces

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