

## **COST D43: Colloid and Interface Chemistry for Nanotechnology**

### **Program Workgroup 4: Nanostructured and bio-inspired materials**

#### **Target of the WG activities**

Colloidal particles represent essential building blocks for nanostructured materials. They further represent essential components in the design of nanocomposite materials (e.g., organic-inorganic, artificial bones, bio-inspired structures). A further important area to be investigated here is internally composite particles, particularly those with a core-shell structure. The synthesis of core-shell particles is a simple example of templating, but this principle can be used to obtain many different types of nanostructured materials. As templates, one uses colloids or liquid crystals, microemulsions or carbon nanotubes. An important source of nanostructured carbon comes potentially from controlled burning of « waste » in the biomass, such as rice husk and orange peels.

Understanding the various properties of resulting nanostructured materials is obviously essential, for example, in the context of the life-time of products (see self-healing paints for planes or for waste containing toxic ions immobilization material). Moreover, these materials have active interfaces, and porous materials coming from nanoparticles self-assembly can be used to assist more conventional cleaning and decontamination processes, which are made by liquid-liquid extraction.

The workgroup will thus pursue several of these avenues towards new nanostructured materials and, in collaboration with industry, investigate potential usage of these materials, as in the biomedical sector, the restoration of art and buildings and the processes involved in decontamination of heavy metals, including selectivity in nano-filtering.

Uniform colloidal particles will also be exploited in Workgroup 2 as reference materials, but they are equally important within this workgroup. Links with work-group 5 are important, since nanomaterials contain a large amount per unit mass of « active interface ». Applications as self-repairing hybrid materials containing polyelectrolytes make links with work-group 3.

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#### **Agreed Member Teams**

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