

Mechanisms of the Formation of Monodispersed Fine Particles and of their Deposition on Solid Surfaces

Egon Matijevic

Center for Advanced Materials Processing (CAMP)

Clarkson University

Box 5814

Potsdam, NY 13676

USA

The most common process for the preparation of uniform particles from micrometer to nanometer size range is by homogeneous precipitation. While a large number of such dispersions has been obtained, most of these have dealt with simple or composite inorganic materials. More recently the attention has been also focused on pure organic compounds.

Despite the successes in the synthesis of monodispersed particles, especially colloidal ones, the understanding of their formation has not kept equal pace. Indeed, it is now recognized that the processes involved in the precipitation of such dispersions are considerably more involved than originally assumed. Ample experimental evidence will be offered to show that in most cases the larger particles are formed by aggregation of nanosized precursors, and a model will be described which defines conditions under which this process can yield uniform products. The understanding of this mechanism provides for a bridge between nano- and micrometer systems, which have been frequently treated as separate areas of materials science.

The availability of well defined dispersions are then used in the study of interactions of particles with plain surfaces, i.e. their deposition and detachment, which will be described from experimental and theoretical points of view.