

From Molecules to Supracolloidal Structures: Building from the Bottom-Up at the Nano- and Micro-Scale

Luciano Galantini

Department of Chemistry, "Sapienza" University of Rome, P.le A. Moro 5, 00185 Rome (Italy)

As the eye rises from the infinitely small to the apparently never ending expanding universe, Nature appears to be always able to arrange the matter according to specific structures.[1] At the nanoscale functional structures are adopted by macromolecules, which are extensively investigated in biology. At the same and larger scales, molecules and colloidal particles can arrange in diverse frameworks to form basic biological units, like cells, and extended superstructures, according to fundamental principles of hierarchical assembly.[2,3] Within this scenario, results are reported on our effort to decipher structure and stability of macromolecules and supramolecular aggregates at the nanoscale, and to rationally direct the association of these and other building blocks to specific functional superstructures at supracolloidal level.[4-6]

The structural study at the nanoscale are reported for: i) proteins like albumin in response to different denaturation conditions[7] and ii) supramolecular aggregates of steroid surfactants (Fig. 1a,b). The effort to direct the supramolecular aggregation to functional building blocks and to supracolloidally assemble them (Fig. 1d) in Atomium like superstructure are therefore described.

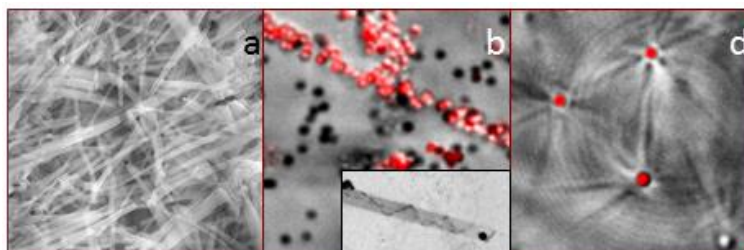


Figure 1. Supramolecular and supracolloidal structures

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