

**Bio-inspired scaffolds to manufacture nanomaterials :
nanotubes & Quantum Dots arrays**

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Nature is an unlimited source of inspiration for the development of materials presenting original optical properties. The current structural knowledge of some of these biological assemblies is promising as an inspiration source to try to mimics their supramolecular organizations. The development of simplified system presenting properties close to biological assemblies is of great interest. To this end, there is still a long way in order to understand not only the structures, but also their formation mechanisms.

Lanreotide molecules self-assemble in water into highly monodisperse supramolecular nanotubes, the diameter and wall thickness of which are 244Å and 18Å respectively. [1] Following biomineralization principles, we show that the self-assembled nanotubes can be used as a template to produce micron-long, bilayered silica nanotubes having a monodisperse diameter of 29 nm. The nanotubes organize spontaneously into centimeter-size, highly ordered bundles. Furthermore, the formation mechanism was elucidated using a range of techniques, including X ray diffraction, optical and electron microscopy [2].

Lamellar hybrid condensed phase in which the QDs are densely packed in the plane of the layers can be prepared [3]. The 3D crystallization of the QDs can be achieved by the addition of actin proteins that polymerize into filaments with well defined pitch and diameter. New photophysical properties will be presented.

These examples of bio-inspired technologies demonstrate the possibility of solving the challenge of efficiency, less expensive and environmental technologies.

References:

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