NATURALLY NANOSTRUCTURED BIOMATERIALS

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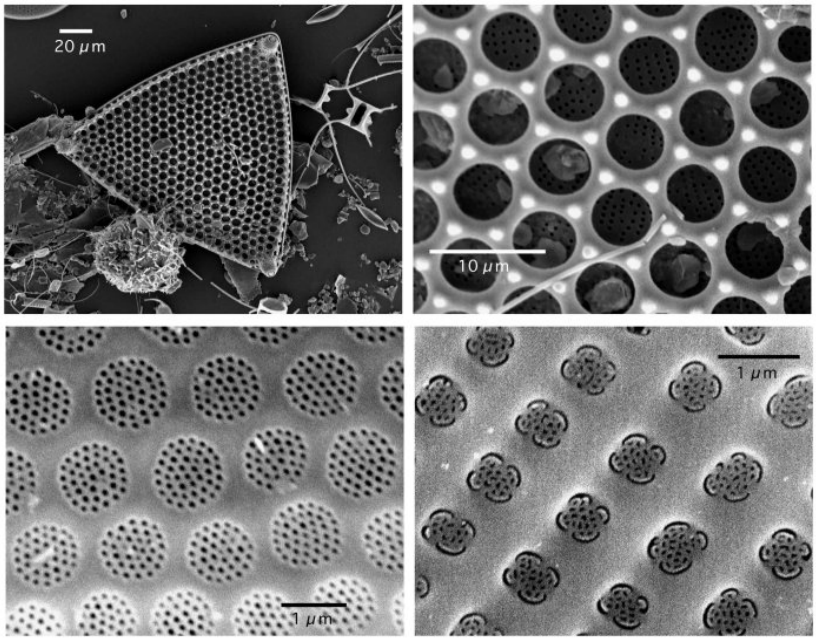
The animated world is full with amazingly beautiful, naturally nanostructured biomaterials. These biomaterials are in many cases multifunctional, and their production in the organism often takes place under benign conditions. This is in strong contrast to current man-made nanostructures.

Understanding the processes involved in biomaterial production by organisms may eventually allow to mimic these strategies to produce optimized functional materials with minimal environmental impact.



Natural Nanostructures

Diatoms are unicellular algae with cell walls consisting of amorphous glass enveloped by an organic case. Diatoms master challenges as diverse as building nanostructured siliceous skeletons with high load capacity and engineering strong and robust adhesives that are stable in wet environments. To grow, they need light, water and few nutrients readily available in rivers and the sea. (Gebeshuber *et al.*, Materials Science and Technology, in press)

Man-made Nanostructures

Highly oriented pyrolitic graphite (HOPG) is freshly cleaved and inserted into an ultrahigh vacuum chamber. Ar^+ ions with 400 eV kinetic energy are produced by a NIER ion source and bombard in low dose (10^{15} ions/cm^2) the HOPG surface. The image shows a nanostructure induced by a single ion impact as visualised by scanning tunneling microscopy. Image size 10∗10 nm^2.