

## ENGINEERING MATERIALS CODED IN DNA

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Bioinspired science which is called biomimetics or bionics is very rapidly increasing. Many engineering achievements based on natural solutions.

Biological systems fabricated high-performance materials with a specific morphology and wide range of properties. Many biological materials have properties which are not achieved in synthetic materials. Moreover, their hierarchical structures at nano, micro and meso scale are coded at DNA and built from limited elements by self-assembly method. The complexity natural structures are mostly composites containing inorganic and organic materials. Majority of biological materials are formed at ambient temperature and at aqueous environment. These features and others inspired scientists to design and fabricate new biomimetic materials.

Modern developing attempts at biomimetics are concentrated on transferring the biological knowledge to engineering solutions. However, there is not tendency to make a direct copy but rather to develop new methods of fabrications of ready to use materials and devices based on natural biomorphic processes. In this way it will be possible to tailor a new generation of engineering materials similar to the biological coded at DNA templates. Such materials are very desirable in many applications, especially in medicine, for variety of devices for electronics and optics. For example based on biomimetic way the formation of porous hydroxyapatite scaffolds as bone replacement are developed. The formation of  $\text{CaCO}_3$  which built the shells is also very extensively investigated.

There are intensively elaborated materials and systems in micro- and nano-scale. For this reason the natural templates with special shape and size are used. Different biomolecules as DNA and nano and micro-organisms as proteins, viruses, bacteria, fibers of plants, skeleton of diatoms and others are treated as templates.

Biomimetics is multi-disciplinary area and needs very close collaboration of scientists of different disciplines as biology, physics, chemistry, medicine and others. Moreover, the biomimetics needs highly advanced techniques of structure characterization and estimation of the properties of natural templates and new created bioinspired materials. Also the new methods of fabrication based on biomimetalization are necessary.

In the present paper some of examples of biomimetic materials and the biomimetic formation of its are described. Also own research which are concentrated on diatoms are included.