

THE STRUCTURAL PROPERTIES OF MOLLUSC SHELLS AS INSPIRATIONBIONIC ENGINEERING

Summary

Bionical creativity engineering is a relatively young branch of science concerned with development of new solutions in technique, inspired by those that are already present in nature. Such solutions are highly efficient and promising due to the fact that living organisms have been evolving for millions of years under the pressure of environmental factors and had developed a highly optimized adaptations designed to reduce this pressure. An example of such adaptation are mollusc shells (Mollusca), which first appeared in the Cambrian fossil records (ca. 500 million years ago), the primary function of which since that time is to protect the

animal inside against predators. Despite the fact that the shell is made of relatively fragile components (calcium carbonate in aragonite and/or calcite form), it has remarkable mechanical properties. This is mainly due to its hierarchical structure and presence of inclusions of organic matter, which significantly increase its resistance to external forces. Currently, researchers are seeking a way to produce materials with similar attributes forging a hierarchical construction of the shell and creating mineral-organic composite materials, so that it may be possible to produce such materials in the future for a widespread use.