

Physical-chemical study of the structure and composition of the shell endoskeleton of strongylocentrotidae and clypeasteroidea sea urchins

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Abstract

Skeleton of sea urchins is internal: skeletal elements of the shell and the needles are covered with a thin layer of the epidermis. Skeleton of the shells represents spongy or honeycomb stereome formed by high magnesian optically continuous calcite with inclusions. Pore spaces are connected into a single system, which can be up to half of the total volume of the skeleton. But so far it is unclear what additional components should be combined (and in what relations), calcium structure of the needles and the shell takes on different qualities of sea urchins, in particular high chemical resistance. That's why the crystal and the chemical composition of the shell of intermediate (gray) of the sea urchin has been studied *Strongylocentrotus intermedius*.

Shells of sea urchins, both spherical and flat *Clypeasteroidea* consist mainly of calcite with admixture of magnesite. Chemical analysis revealed that after calcining shells and needles of gray sea urchin at 700 °C silica content was 0.5%. Then about 100 grams of finely divided calcined skeleton of gray sea urchin was dissolved in hydrochloric acid, acid-insoluble membrane was formed on the surface of the solution. The membrane was picked and dissolved in toluene. White substance was allocated as the precipitation from toluene solution by hexane, which according to elemental analysis and X-ray diffraction and infrared spectroscopy is polyphenylsiloxane. It was also confirmed by comparing the IR spectrum and the diffraction pattern of a known substance.