

Abstract

This thesis summarizes current knowledge of patterns and structures at various scales, with an emphasis on the use of these patterns in the microworld and also on the materials that are most often used. Patterns are applied in all areas of natural processes and human activity. There are many analogous models at different scales, but we do not know if they have the same self-organizing mechanisms. Many patterns formed by microorganisms can be prepared without their presence, on the basis of physical and chemical methods, so they are probably created under certain parameters that can be influenced by a given protist. These patterns are evolutionarily advantageous for microorganisms, because they provide them with a number of functional adaptations, mainly in connection with defense against predators and movement in the water column, which is based on the organism's life strategy. The mathematical description of the pattern is extremely important for its further research and for determining the laws that have allowed the organism to benefit from its parameters.

Keywords: pattern, structure, convection, reaction – diffusion model, geometry, protist, microorganism, skeletons, shells, scales