Abstract

The mankind has always been interested in the origin of life on Earth or in the universe. The Oparin’s theory\(^1\) replaced creationist metaphysical theories (of gods’ actions on Earth to create life) in the beginning of the twentieth century. This theory explained production of basic building blocks of life like amino acids, nucleobases and sugars from abiogenic mixture of gases and subsequent formation of so-called coacervates. The synthesis of amino acids was then confirmed by experiments of Miller and Urey\(^2\). Especially the theory of simple formation of nucleobases became an essential contradiction between evolutionary and molecular biologists and chemists. From biological point of view it seems very probable that primal life structures were based on the self-replicating molecule of RNA. From chemical point of view the synthesis of nucleobases seemed very problematic, therefore the models of life structures based on amino acids were favorited. This opposes the basic dogma of molecular biology, which postulates one-way transcriptions of nucleobases’ sequence into amino acids’ sequence exclusively. In our experiments we follow the idea of simple production of nucleobases from formamide molecule in possible primordial conditions. The mixture of formamide with different types of clays was exposed to heating of 160 °C in the presence of NiFe meteorite. The aim of this was to observe the dependency of the yield of nucleobases in the presence of this meteorite, which was recently proclaimed by biochemist J. Sutherland\(^3\) to have positive effect on abiogenic syntheses. It turned out the presence of iron meteorite has significant negative effect on nucleobases’ yield. Nevertheless, if the iron atom is intercalated in the clay molecule, the yield of nucleobases is increasing. It can be presumed that if early Earth’s environment was rich on iron, which was intercalated into porous minerals by erosion (like on Mars nowadays), the synthetic reactions leading to the creation of nucleobases could have been favorited by catalytic effects of such minerals. These reactions could be the first step of production of more complex biogenic substances, which are necessary for the origin of life on Earth.

Key words
Formamide, origin of life, clays, abiogenesis