

Effect of mineral species on the glycine polymerization

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Protein is a major constituent of life on the earth, and is produced by polymerization due to dehydration condensation of amino acids. Polymerization of amino acids is an important process for the origin of life. The understanding of amino acid polymerization process in the earth surface environment is important for the origin of life. It is well known that polymerization of amino acids under the ambient condition is thermodynamically difficult. Therefore, how the amino acids polymerization in the early earth environment proceeded is still under debates.

Many model experiments for amino acid polymerization had been designed so far. Among them, one of the promising method is mixing the mineral powder with glycine solution with heating (e.g., Bujdak and Rode, 1997a). Bujdak and Rode, (1997b) was confirmed that alumina could promote alanine polymerization than Quartz. They suggested that the effect of mineral type is important on the polymerization of amino acids. However, it is not known which functions of the mineral affect the amino acid polymerization. After Bujdak and Rode, (1997b), amino acid polymerization experiments by using various type of mineral species has been widely examined. However, the experiment condition has not been unified among the studies. We cannot compare the effect of amino acid polymerization on each mineral. In present study, we conducted the experiments of amino acid polymerization using t various types of minerals (Rutile, Anatase, Amorphous silica, Quartz, gamma-Al₂O₃, Corundum, Hematite, Magnetite, Forsterite) under the unified experimental conditions. The purpose of the study is to clarify the factors for promoting the amino acid polymerization in mineral species.

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