

## the possibility of the abiotic synthesis of the chiral amino acids by glycinate-Cu complex

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Amino acids are important organic molecule for the living organisms today. And it is thought that the amino acid had an important role in the origin of life and a process of chemical evolution. Except for the simplest molecule, glycine, 19 amino acids constituting a protein to create organisms have 2 enantiomeric isomers. L-amino acids constitute protein, and it is the organic matter that is required for all organisms. On the other hands, D-amino acids have low importance with a particularly higher organisms, and existence degree in their body is small.

It has been not understood well how such a molecular asymmetry of amino acid was occurred. Today's researchers pursue the origin of molecular asymmetry in space, and actually, there is a report to suggest a thing with much L-amino acids in Orion big spots cloud<sup>(1)</sup> and a Murchison meteorite.<sup>(2)</sup> However, we examine the amino acid which is chiral from the material which is not chiral chemically to apply Akabori method<sup>(3)</sup> and its analogy known as the manufacturing method of industry of an amino acid synthesis for a long time from a point of view that a molecular asymmetry desires to demand the symmetric origin on the earth.

Acetaldehyde was condensed with glycine (non-chiral amino acids) by glycine-Cu complex in a basic condition, and the products, threonine and allothreonine were prepared by the separation of metal and amino acids with ion-exchange chromatography. The chiralities of these products were estimated with chiral-GC method by their N-trifluoroacetoamide-n-butyl ester. At first, the structure of the products was confirmed by GC-MS, and estimation of chirality was conducted 6 times with each samples.

The result of the estimation of chirality with each 2 experiment for threonine and allothreonine was as follows: threonine-1.6% ee. (enantiomeric excess) L, and 4.7 % ee. L; allothreonine-0.1 % ee. D, and 0.1 % ee. D. Thus, threonine were slightly, but significantly chiral although allothreonine was almost completely racemic.

The estimation of racemization of threonine at the reaction condition, and the synthesis of N-methyl amino acid (existed in the meteorite with slightly chiral) by alanine-Cu complex are planned.

(1) Bailey *et al.* (1998) *Science* 281, 672.

(2) Engel *et al.* (1990) *Nature* 348, 47; Cronin *et al.* (1997) *Science* 275,951.

(3) Akabori *et al.* (1957) *Bull. Chem. Soc. Jpn* 30, 937.