SEARCH FOR NUCLEIC ACID BASES IN ANTARCTIC CARBONACEOUS CHONDRITES

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Carbonaceous chondrites contain extraterrestrial organic compounds. These compounds are abiotic in origin and give useful information for the study of prebiotic chemistry and the origin of life. We have analyzed organic compounds in Antarctic carbonaceous chondrites and found indigenous amino acids, carboxylic acids, and hydrocarbons. We extended our analysis to nucleic acid bases. We report here the result of our analysis.

The sample we examined are Yamato-74662, Yamato-791198, Yamato-793321, and Belgica-7904, all of which are C2 chondrites from Antarctica. Our analytical procedures are briefly as follows: A piece of the chondrite sample was powdered and extracted with water, formic acid, and HCl-HF, successively. These extracts were desalted separately by an ion exchange column and examined for nucleic acid bases by a HPLC with multi-channeled uv detector in the range of 205 to 350 nm.

We found xanthine, hypoxanthine, and guanine, but not other nitrogen bases. Those three nitrogen bases were found in the formic acid extract from Yamato-74662(Fig. 1) and Yamato-791198, but not from the other two chondrite samples. The abundance of those bases are ca. 30 ng/g for hypoxanthine from Yamato-791198 to ca. 400 ng/g for guanine from Yamato-74662. We did not detect the nitrogen bases in water and HCl-HF extract of all four chondrite samples.

Our previous studies showed abiotic amino acids were detected in the extract from Yamato-74662(Shimoyama et al, 1979) and Yamato-791198(Shimoyama et al 1985), but little from Yamato-793321 and Belgica-7904(Shimoyama and Harada, 1984). The present analysis of the nitrogen bases give a very similar result as to which chondrites yield these organic compounds. In comparison to other investigations on the nitrogen bases in carbonaceous chondrites, our result is samewhat similar to those reported by Van der Velden and Schwartz(1977) and Stocks and Schwartz(1981). We will describe our finding of these nitrogen bases.



Fig. 1 HPLC chromatogram of the formic acid extract from Yamato-74662.

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