DELIVERY OF EXTRATERRESTRIAL AMINO ACIDS BY COSMIC DUSTS: CURRENT STATE OF ORGANIC EXPOSURE EXPERIMENT IN THE *TANPOPO* MISSION. K. Kobayashi[1], H. Mita[2], Y. Kebukawa[1], K. Nakagawa[3], K. Ishiyama[3], R. Aoki[1], T. Harada[1], S. Misawa[1], E. Uchimura[1], T. Sato[1], K. Naito[1], S. Minematsu[2], E. Imai[4], H. Yano[5], H. Hashimoto[6], S. Yokobori[6], A. Yamagishi[6] [1]Department of Chemistry, Yokohama National University (79-5 Tokiwadai, Hodogaya-ku, Yokohama 240-8501, Japan), [2]Fukuoka Institute of Technology, Japan, [3]Kobe University, Ja[4]pan, Nagaoka University of Technology, Japan, [5]JAXA/ISAS, Japan, [6]Tokyo University of Pharmacy and Life Scieces, Japan

Introduction: Since a wide variety of organic compounds have been detected in extraterrestrial bodies such as carbonaceous chondrites [1], comets [2] and cosmic dusts (IDPs) [3], it is plausible that organic compounds were delivered by them in prior to the generation of the life on the Earth. Chyba and Sagan [4] suggested that cosmic dusts delivered much more organics to the primitive Earth than meteorites and comets. It is difficult, however, to detect bioorganics in cosmic dusts if they are collected in the terrestrial biosphere.

The Tanpopo Mission is the first astrobiology space mission utilizing the exposed facility of JEM, ISS [5]. The mission includes collection of cosmic dusts and space exposure of amino acid-related compounds (free amino acids and their precursors) in order to examine possible delivery of extraterrestrial amino acid-related compounds by cosmic dusts. The mission started in May 2015, and the first sample returned to the Earth in August 2016 after about 1 year's exposure in space. The other samples will retune to the Earth in 2017 and 2018, after 2 or 3 years' space exposure. Here we report the first analytical results of the organic exposure experiment in the Tanpopo Mission.

Experimental: *Targeted materials of organic exposure experiment.* The following five materials were selected for the space exposure: (i) $^{13}C_2$-glycine, (ii) $^{13}C_5$-isovaline, (iii) $^{13}C_3$-hydantoin (a precursor of glycine), (iv) $^{13}C_6$-5-ethyl-5-methylhydantoin (a precursor of isovaline) and (v) products by proton irradiation of a gas mixture of ^{13}CO, NH_3 and H_2O (hereafter abbreviated as *CAW*). CAW is a mixture of complex organic compounds including amino acid precursors [6]. Aqueous solution of each of these materials was added to one of dimples on an aluminum plate, and dried. Then 1 μL of saturated hexatriacontane in methanol was added to each dimple, and dried. Each plate for space exposure was covered with a SiO_2 or MgF_2 window. The same kind of plates were prepared for (i) dark controls (exposed in space but no light allowed), (ii) cabin controls (stored in the JEM cabin), and (iii) ground controls.

Alanine thin film was used as a VUV dosimeter based on a dissociation experiment with a 172 nm eximer lamp [7]. Optically stimulated luminescence dosimeter (OSLD). and Silver activated phosphate glass dosimeter (RPLD) were used as radiation dosimeters. The dosimeters and the exposure plates were combined together to be an exposure panel, which was attached to an ExHAM module and exposed on the Exposed Facility (EF) of Japanese Experimental Module (JEM) of ISS.

Analysis. The material in each dimple was collected by using small amount of methanol and water. Amino acids were determined by HPLC (Amino acid precursors and CAW were determined after acid-hydrolysis). The materials were also analyzed by GC/MS and LC/MS.

Preliminary results and discussion will be shown in our poster.

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