Third year results and current status of Tanpopo: Capture and exposure experiment of micrometeoroids and microbes on Exposure Facility of International Space Station

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Tanpopo, a dandelion in Japanese, is a plant species whose seeds with floss are spread by wind.We proposed this mission to examine possible interplanetary migration of microbes, and organic compounds at the Exposure Facility of Japan Experimental Module (JEM: KIBO) of theInternational Space Station (ISS) [1-4]. The Tanpopo mission consists of six subthemes: Capture of microbes in space (Subtheme 1), exposure of microbes in space (Subtheme 2), analysisof organic compounds in interplanetary dust (Subtheme 3), exposure of organic compounds inspace (Subtheme 4), measurement of space debris at the ISS orbit (Subtheme 5), and evaluation of ultralow-density aerogel developed for the Tanpopo mission (Subtheme 6). Exposure Panels for exposure of microbes and organic materials and Capture Panels for aerogel were launched on April 2015. The Panels were placed on the Exposed Experiment Handrail Attachment Mechanism (ExHAM) in the ISS. The ExHAM with Panels were placed on the Exposure Facility of KIBO (JEM) with the Japanese robotic arms through the airlock of KIBO. The trays and panels were exposed for more than one year. The first set of Capture Panels and an ExposurePanel were retrieved on June 2016, returned to the ground and passed over to Tanpopo teamfor the analyses in September. Second- and third- year sets have been returned in 2017 and 2018, respectively. Aerogel blocks in Capture Panels are inspected by the automated microimage detector CLOXS. Tracks and particles identified will be used for organic and inorganic compounds, as well as microscopic analyses [3]. An Exposure Panel consists of 20 ExposureUnits. The returned Exposure Panel was disassembled to the units, each was handed overto the researchers for organic compound and microbiological analyses [4] to test the panspermia hypothesis in the latter [5,6]. Environmental data and survival of a radioresistant speciesDeinococcus aetherius after one-year exposure in space have been published [7]. Current statuswill be presented.

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