

MICROGRAVITY SCIENCES AND PROCESSES SYMPOSIUM (A2)
Microgravity Sciences Onboard the International Space Station and Beyond - Part 2 (7)

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ELECTROSTATIC LEVITATION FURNACE EXPERIMENT FOR “KIBO” ON INTERNATIONAL
SPACE STATION

Abstract

Containerless processing techniques combined with non-contact diagnostic methods play significant roles in thermo-physical property measurements of high temperature melts because these methods can circumvent problems which arise from a reaction between container and melts. The electrostatic levitation method is to use Coulomb force between charged sample and electrodes and it controls the sample position by using high speed feed-back of camera image. The ELF can measure density, surface tension, and viscosity of high temperature materials. Japanese Aerospace Exploration Agency has studied the fundamental technique of the electrostatic levitation, and measured a variety of thermo-physical data by using ground electrostatic levitation furnace for more than ten years. Due to the gravity effect, however, it is limited to levitate certain type samples such oxide on ground. To resolve this issue, JAXA has started to develop the Electrostatic Levitation Furnace (ELF) which will be operated in KIBO, which is Japanese

Experiment Module (JEM) on International Space Station, so that can levitate more types of samples. JEM ELF is currently being in critical design phase and the functional testings have been conducted by using ground model of ELF since 2012 in order to obtain the characteristics regarding the observation, heating or positioning control capabilities. This paper shows a summary of design feature of JEM ELF and the results from ground testings, also discussed the issues to resolve for the JEM ELF flight model.