MICROGRAVITY SCIENCES AND PROCESSES SYMPOSIUM (A2)
Facilities and Operations of Microgravity Experiments (5)

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DESIGN OF MICROGRAVITY EXPERIMENTS AND RESEARCH USING ILAB

Abstract

In 2010, the United Nations Office for Outer Space (UNOOSA) started the Human Space Technology Initiative (HSTI). One of the objectives of HSTI is to create a platform for Member States of the United Nations (UN), especially the developing countries, to participate in harnessing the benefits derived from the utilization of the International Space Station (ISS). HSTI is also aimed at building global capacity in microgravity education and research. One of the challenges to achieving these objectives in developing countries is the lack of equipment, facilities and laboratories, to perform experiments and researches. This challenge can be overcome with the use of the iLabs.

An iLab is an online laboratory platform which makes use of the three-tiered architecture developed by the Massachusetts Institute of Technology (MIT). With iLabs scientists are able to remotely access a physical laboratory setup and perform experiments on this setup. Hence, a scientist living in a challenged environment, for example, a developing country, can directly access equipment and laboratory facilities situated in a privileged environment or institution. An example of the success of iLabs can be seen in the sharing of MIT's microelectronics labs with the Obafemi Awolowo University, Nigeria, Makerere University, Uganda and the University of Dar Es Salaam, Tanzania.

This paper introduces a remotely controlled microgravity experiment involving the synthesis and modelling of supramolecular organometallic complexes through self-assembled techniques. It details the procedure involved in interfacing a microgravity instrument with available iLabs facilities and simulating its effectiveness in conducting experimental researches.

iLab can be implemented in the UN-affiliated regional centers for space science and technology education. This will increase the success of HSTI. It will also promote cooperation among the regional centers, and between a regional center and a host institution.