

IAF MICROGRAVITY SCIENCES AND PROCESSES SYMPOSIUM (A2)
Life and Microgravity Sciences on board ISS and beyond (Part I) (6)

Author: Dr. Sandra Schumann

Deutsches Zentrum für Luft- und Raumfahrt e.V. (DLR), Germany, sandra.schumann@dlr.de

Mrs. Angelika Diefenbach

Deutsches Zentrum für Luft- und Raumfahrt e.V. (DLR), Germany, angelika.diefenbach@dlr.de

Dr. Stephan Schneider

Deutsches Zentrum für Luft- und Raumfahrt e.V. (DLR), Germany, Stephan.schneider@dlr.de

Dr. Rainer Willnecker

Deutsches Zentrum für Luft- und Raumfahrt e.V. (DLR), Germany, rainer.willnecker@dlr.de

CONTAINERLESS PROCESSING ON ISS: EXPERIMENT OPERATIONS IN ESA'S EML, THE
ELECTROMAGNETIC LEVITATOR

Abstract

EML is an electromagnetic levitation facility built for the ISS aiming at processing liquid metals or semiconductors under microgravity and thus reduced electromagnetic field and convection conditions. Its diagnostics and processing methods allow to measure thermophysical properties in the liquid state and to investigate solidification phenomena. EML resides in the European Drawer Rack inside the Columbus Module and inboard the ISS since June 2014. The payload was developed by an industrial consortium under the leadership of Airbus DS on behalf of the European Space Agency.

The Microgravity User Support Centre MUSC at Cologne, Germany, has been assigned the responsibility for EML operations under ESA contract and operates the experiments on behalf of the international science community.

Since April 2015 EML is in use for science runs. In this timeframe over one thousand individual experiments on 36 metals and alloy systems were performed, including the first successful processing of different semiconductors in EML.

To enhance the scientific output the so called 'Sample Coupling Electronics' has been integrated into EML, whereby electrical resistivity and thermal expansion can be derived.

During the Alexander Gerst Mission in late summer 2018 it is planned to upgrade the operating system of one of the main diagnostic tool of EML – the High Speed Camera. The advantages of the lossless compression and the larger disk space for performing and post processing of science runs will be discussed.