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Life and Microgravity Sciences on board ISS and beyond (Part I) (6)

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MATERIAL SCIENCE LAB OPERATIONS ONBOARD THE INTERNATIONAL SPACE STATION

Abstract

The Materials Science Laboratory (MSL) onboard the International Space Station is designed for the research on solidification processes under microgravity conditions. It is equipped with two exchangeable furnace inserts of Bridgman-type allowing temperatures of up to 1400 °C. MSL is operated under ESA contract by the Microgravity User Support Center (MUSC) at DLR in Cologne in collaboration with Marshall Space Flight Center at Huntsville which is responsible for the Materials Science Research Rack (MSRR) which hosts MSL and provides services. MSL was launched in 2009 and installed in the US Destiny laboratory module. Since then a number of experiments by different project teams have been performed and research is still ongoing. Since 2018, a new type of cartridges developed by NASA allows investigation of sintering processes within MSL. The paper will give a survey on MSL operations over the last decade and provide an outlook for future MSL planning.