

MICROGRAVITY SCIENCES AND PROCESSES (A2)
Fluid and Materials Sciences (2)

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MODELING AND EXPERIMENTAL CHARACTERIZATION OF THE MICROSTRUCTURE AND
GRAIN STRUCTURE OF AL-7WT%SI DIRECTIONALLY SOLIDIFIED

Abstract

Controlling the solidification microstructure of metallic materials is the main objective of several researches developed nowadays due to its strong influence on the mechanical properties. During the solidification process, the natural convection in the liquid metal caused by the action of the gravitational field and sedimentation can produce important changes in the final structural morphology, from microstructural up to macrostructural scales. The objective of this study is to analyze the evolution of the microstructure and grain structures of an Al - 7 wt%Si. These ground experiments and associated simulations are part of a Microgravity Application Programme from the European Space Agency named Columnar to Equiaxed Transition in Solidification processing. In the frame of this project, experiments have been performed in the Materials Science Laboratory of the International Space Station on the same alloy. In a subsequent step, results of the microgravity experiments will be compared to the preparatory ground experiments presented here and simulations will be extended to microgravity experiments.