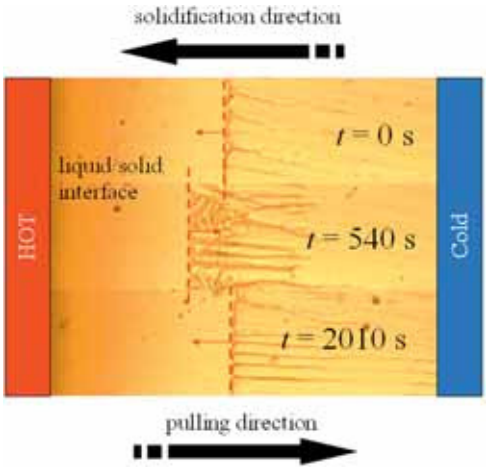
METTRANS

Metastable Solidification of Composites: Novel Peritectic Structures – Studies with Transparent Model Alloys

Transparent model systems of peritectics are quite attractive for furthering our understanding of solidification of metastable in situ composites. Such systems offer the advantage that both the morphology and the dynamics of solidification can be investigated by using optical diagnostic means. The comparison of experiments both on Earth and in Space gives access to determine directly the effect of gravitational phenomena as natural convection on the growth morphology and dynamics of peritectic solidification. In cooperation with the ESA-MAP project METCOMP, the present project is intended to directly observe morphological changes of the solid/liquid interface for the transparent metal-like solidifying peritectic model system Neopentylglycol – Tris(hydroxyl-methyl)aminoethan. It is planned to perform systematic studies of the peritectic solidification phenomena, which occur at the limit of constitutional undercooling around the peritectic point. As known in literature, a number of different morphologies are possible: oscillatory morphologies (bands), coupled growth (lamellar, island), etc. So far our observations indicate an unexpected unsteady seaweed-like morphology which is highly dependent on time. As all these morphologies are strongly influenced by the presence of convection, it is planned to perform experimental investigations under reduced gravity conditions using the DIRSOL facility on board the International Space Station/ISS in 2008.
METTRANS is a complementary project that will assist the ESA-MAP project METCOMP to further study the technical requirements that have to be fulfilled, in order to perform micro gravity experiments in the DIRSOL facility of the Microgravity Science Laboratory, MSL, located in the European Columbus Model on board the ISS.



Infobox

Project duration:
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