

Te- and Zn-doped InSb Crystals Grown in Microgravity

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Abstract

In 2002, within the SUBSA (Solidification Using a Baffle in Sealed Ampoules) investigation, seven doped InSb crystals were grown in microgravity at the International Space Station. The key goals of the SUBSA investigation are: (a) to clarify the origin of the melt convection in space laboratories; (b) to reduce melt convection to the level which allows reproducible diffusion-controlled segregation; (c) to explore the submerged baffle process and liquid encapsulation in microgravity.

30 crystal growth experiments were conducted in the ground unit, to optimize the design of flight ampoules and to test the transparent SUBSA furnace developed by TecMasters Inc. The specially designed furnace, allowed observation of the crystal growth process (melting, seeding, motion of the solid-liquid interface, etc.).

In the summer of 2002, eight crystal growth experiments were conducted in the Microgravity Science Glovebox (MSG) facility at the ISS. Four Te-doped ($k = 0.5$) and three Zn-doped ($k=2.9$) crystals were grown on undoped seeds. In one experiment, we were not able to seed and grow. The seven grown crystals were sectioned and analyzed using SIMS. The design of the SUBSA ampoules, the segregation data and the video images obtained during the SUBSA flight experiments will be presented and discussed.