Bubble Induced Disruption of a Planar Solid-Liquid Interface during Controlled Directional Solidification in a Microgravity Environment

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Pore Formation and Mobility Investigation (PFMI) experiments were conducted in the microgravity environment aboard the International Space Station with the intent of better understanding the role entrained porosity/bubbles play during controlled directional solidification. The planar interface in a slowing growing succinonitrile - 0.24 wt% water “alloy” was being observed when a nitrogen bubble traversed the mushy zone and remained at the solid-liquid interface. Breakdown of the interface to shallow cells subsequently occurred, and was later evaluated using down-linked data from a nearby thermocouple. These results and other detrimental effects due to the presence of bubbles during solidification processing in a microgravity environment are presented and discussed.