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EXPERIMENT STUDY ON MARANGONI CONVECTION IN A LARGE SCALE LIQUID BRIDGE ON GROUND

Abstract

Abstract: The floating zone technique is a processing method for high purity crystal growth. By the joint effects of gravity and surface tension, the floating zone will generate thermal convection. When the temperature difference reaches the critical value, the flow in the zone will be unstable, which is called thermocapillary oscillatory convection, it can seriously affect the growth of crystals, and special attention have been paid to the transition from steady to oscillation. To cooperate with the TG-2 space experiment project, this paper studies the flow evolution of lagre scale liquid bridge with high Prandtl number. In this paper, thermal image camera is used to observe the flow field structure and temperature distribution. In high Prandtl number condition, the critical temperature difference or the corresponding Marangoni number will tend to vary with the volume ratio, besides, the fluid field can flow from stable state via unstable state to confusion. Traveling wave will appear when the Marangoni number exceeds the critical value, and the chao state will follow with higher temperature difference.