

MICROGRAVITY SCIENCES AND PROCESSES SYMPOSIUM (A2)  
Microgravity Experiments from Sub-Orbital to Orbital Platforms (3)

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THE PATTERN TRANSFORMATION OF THERMOCAPILLARY CONVECTION IN AN OPEN  
ANNULAR POOL ON SJ-10 SATELLITE

**Abstract**

The space microgravity environment provides a good research platform for study of thermocapillary convection volume effects. The convection pattern transformation and oscillation behavior are the main characteristics of the convection instability and transition. It is helpful to deeply understand the nonlinear characteristics, flow stability, bifurcated transition, and other basic laws of the thermocapillary flow system, and it is also beneficial to realize and improve the processing and chemical technology of the ground and space materials. The present study is the microgravity experiment "Space experiment on surface wave of thermocapillary convection", which has been performed aboard the SJ-10 satellite of China. The scientific goal is to build an annular (cylindrical) liquid pool as a space experiment system of thermocapillary convection, and to study the instability laws and transition process. The space experiment results in the present paper are as follows: 1) The fluid injection volume has been changed to form different fluid interface configurations. 2) An infrared thermal imager has been used to measure the changes in the surface temperature of the fluid, the convection pattern transformation has been studied, and the traveling wave and standing wave have been found. 3) By extracting the single point temperature of fluid surface changes with time, the critical conditions and transition process of the fluid convection have been obtained.