

MICROGRAVITY SCIENCES AND PROCESSES SYMPOSIUM (A2)
Fluid and Materials Sciences (2)

Author: Mr. Eric Becnel

University of Alabama in Huntsville, United States, eric@radiobro.com

Dr. Francis Wessling

University of Alabama in Huntsville, United States, wesslif@uah.edu

SURFACE ROUGHNESS EFFECTS ON MICROGRAVITY BOILING

Abstract

Nucleate and pool boiling in microgravity presents many challenges due to the lack of gravity driving the bubble departure. This paper continues on a previous presentation which presented an instrument concept to test the heat transfer of materials with varying surface roughness. Previous experiments by others show that in a microgravity environment, buoyancy is not a contributing factor in bubble departure. Surface roughness drives this departure and affects the heat transfer. To better understand the effects of surface roughness on boiling, a device has been designed to test multiple surface materials against a common liquid. The instrument allows for multiple samples to be tested using a common set of instrumentation. The instrument is being developed for a CubeSat platform. This paper presents the terrestrial testing process of the instrument along with the results of these tests. The instrument needs to be integrated to a satellite bus for orbital demonstration and the changes involved in this are outlined. The results of these tests will improve understanding of the physics of boiling in microgravity.