

MICROGRAVITY SCIENCES AND PROCESSES (A2)  
Science Results from Ground Based Research (4)

Author: Mrs. Elham Jafar-Salehi  
Ryerson University, Canada, elham.jafarsalehi@ryerson.ca

Dr. Morteza Eslamian  
Ryerson University, Canada, m.eslamian@utoronto.ca  
Prof. Ziad Saghir  
Ryerson University, Canada, zsaghir@ryerson.ca

ON THE EVALUATION OF THERMODIFFUSION AND SIMULATION OF CONVECTION IN  
SEMICONDUCTOR-MOLTEN METAL MIXTURES**Abstract**

This research reports on thermodiffusion (thermomigration) phenomenon and convection in a binary mixture of silicon and Aluminum utilizing Temperature Gradient Zone Melting (TGZM) method. The TGZM method is used in fabrication of MEMS, NEMS, solar cell and etc. Here the linear non-equilibrium thermodynamics was used to study thermodiffusion and numerical techniques was used for convection investigation. The predicted result showed a good agreement with experimental data qualitatively. It was determined that inadequacy of non-equilibrium thermodynamic model and the uncertainties in experimental data due to thermodiffusion and gravity induced convection in molten zone cause the discrepancies between experimental and numerical results. Moreover, the convection influence on mixture becomes prominent and produces unwanted mixture when the aspect ratio and thickness are increase in cell model.