

MICROGRAVITY SCIENCES AND PROCESSES SYMPOSIUM (A2)
Microgravity Sciences Onboard the International Space Station and Beyond - Part 1 (6)

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PRELIMINARY RESULTS OF THE DSC ON SODI EXPERIMENTS: EXPERIMENTAL
DETERMINATION OF SORET COEFFICIENTS IN TERNARY LIQUID SYSTEMS

Abstract

The DSC on SODI experiment was conducted aboard the International Space Station in late 2011 and early 2012. The objective of this experiment is to obtain experimental measurement of thermodiffusion and diffusion coefficients in ternary liquid systems. Preliminary analysis of the obtained data was performed. Only the thermodiffusion coefficients are reported here. During the measurement campaign, around fifty experiments were performed. Five ternary systems and one binary system of dodecane (C12) - isobutylbenzene (IBB) - tetrahydronaphtalene (THN) were investigated at two different temperatures (25C and 35C). The compositions of the studied systems are reported in table (Tab. 1). The implemented experimental technique is based on the interferometric measurement of the variation of the composition field in a parallelepipedic liquid volume. The thermodiffusion coefficients are obtained by imposing a temperature gradient to the liquid and by measuring the compositional segregation at steady state.

SYSTEM COMPONENT MASS FRACTIONS (

THN IBB C12

1 10 10 80

2 10 80 10

3 80 10 10

4 45 10 45

5 40 20 40

6 50 - 50

Tab.1 Composition of the DCMIX1 system (mass fractions)

The acquired experimental data were stored on hard drives and will be analyzed as soon as they are delivered to the ground. However, for each run, a few images were downloaded in order to monitor the functioning of the experiment. The analysis of this partial data already allows obtaining the Soret of all the investigated systems. The different steps of post processing are described and the values of the obtained coefficients are compared with literature data.