



# Coarsening in Solid-Liquid Mixtures-2 (CSLM-2)



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## Objective:

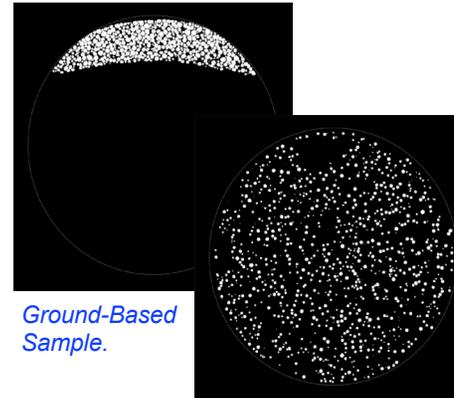
- ◆ Support the development and accuracy of theoretical models of the Ostwald Ripening (coarsening) process.
- ◆ Determine the factors controlling the morphology of solid-liquid mixtures during coarsening.
- ◆ For a two-phase eutectic mixture, determine the steady state dependence of the rate constant, particle size distribution and particle spatial distribution on the volume fraction of the coarsening phase.

## Relevance/Impact:

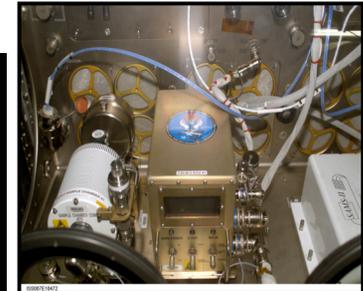
- ◆ CSLM-2 will aid in materials selection for high temperature materials, such as nuclear propulsion and waste heat coolant loops.
- ◆ CSLM-2 results will provide results that will improve design codes that are based on incomplete models and databases.

## Development Approach:

- ◆ CSLM-2 hardware design based on CSLM which flew on MSL-1.
- ◆ Electrical Control Unit (ECU) and support hardware on-orbit. Used successfully in the MSG with Sample Processing Unit (SPU) # 1.
- ◆ Samples are developed by the PI and then integrated into the SPU's by the engineering team.
- ◆ Launched 5 SPU's with high volume fractions on Flight 13A.1 on 8 August 2007. The three of the five SPU's were successfully processed on board the ISS during Inc 16 on 1-30 Dec 2007.
- ◆ Launched 3 SPU's on Flight 1J/A on 11 March 2008. The 3 SPU's started the on orbit operations in the MSG Facility during Inc 17 on 14-30 April 2008.



Ground-Based Sample.



CSLM-1: Sample from MSL-1 mission.

Flight SPU#1 and Flight ECU#1 installed in the MSG on board ISS.

## ISS Resource Requirements

<b>Accommodation (carrier)</b>	Microgravity Science Glovebox
<b>Upmass (kg)</b> (w/o packing factor)	19.5 (6.5kg/SPU) 3 SPU's up
<b>Volume (m<sup>3</sup>)</b> (w/o packing factor)	0.04 for 3 SPU's
<b>Power (kw)</b> (peak)	0.15 operate one SPU at time
<b>Crew Time (hrs)</b> (installation/operations)	14 hours crew time
<b>Autonomous Ops Time (hrs)</b>	10, 4, and 24 hours
<b>Launch/Increment</b>	1JA/Increment 17

## Project Life Cycle Schedule

Milestones	ICR	RDR	PDR	CDR	VRR	Safety	FHA	Launch	Ops	Return	Final Report
<b>Actual</b>	10/1998	N/A	N/A	9/2000	9/2000	3/2002	9/2002	11/2002	8/2003	7/2005	Return+18m
<b>Actual/Baseline</b>							2/2008	3/2008	Inc.17	Inc. 17	Return+18m