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DECLIC, NOW AND TOMORROW

Abstract

DECLIC is a multi-user facility to investigate critical fluids behaviour and directional solidification of transparent alloys.

As part of a joint NASA/CNES research program, the facility was launched with 17-A Shuttle flight and has been operated onboard the ISS since October 2009. The main instrument monitoring is made from the CADMOS (CNES, France)

All the three developed inserts have been tested so far and preliminary results have already been presented during past IACs [1]. The results obtained with those three inserts have led the NASA and CNES founded scientists to ask for a utilization extension, mainly based on inserts refurbishments and new inserts developments.

As a stepping stone towards the oxidation into supercritical water studies, the HTI (High Temperature Insert) has seen its cell (containing pure water) changed by an identical cell containing a dilute aqueous

mixture of Na2SO4 – 0.5% w. The so-called HTI-R insert will be launched with ATV-4 in April 2013 and preliminary results should be available by the time of the congress. The main objective is to study salt precipitation phenomena close to the critical temperature and in the presence of a temperature gradient.

The DSI (Directional Solidification Insert) is also being refurbished in order to replace the cartridge by a similar one containing a different camphor concentration. Consequently, another parameter (camphor concentration) will be added to the parameters available onboard the payload (furnace's temperatures and cartridge's speed). The so-called DSI-R insert should be launched with SpX-4.

The paper will focus on those two refurbishments but also on future refurbishments and developments

- Complementary refurbishments for the HTI and DSI inserts
- ALI (Alice Like Insert) refurbishment in order to implement a cell that will be filled as close as possible to the critical density
- Development of an insert dedicated to supercritical fluids studies and containing a tunable density cell

Then, operations until 2018 are expected!

REFERENCES

[1] G Pont et Al. "DECLIC, Soon Two Years of Successful Operations" IAC-11.A2.5.4 (2011)