Proceedings of the 5th World Congress on Momentum, Heat and Mass Transfer (MHMT'20)
~~Lisbon, Portugal~~ Virtual Conference – October, 2020
Paper No. ICMFHT 114
DOI: 10.11159/icmfht20.114

Experimental Study of Solid/liquid Thermal Shock in Carbon Dioxide

Jean Muller[1,2], Romuald Rullière[2], Pierre Ruyer[1], Marc Clausse[2]
[1]Institut de Radioprotection et de Sûreté Nucléaire (IRSN), PSN-RES, SEMIA, LIMAR,
Cadarache, BP 3, St Paul-Lez-Durance, 13115, France
jean.muller@irsn.fr; pierre.ruyer@irsn.fr
[2]Univ. Lyon, CNRS, INSA-Lyon, Université Claude Bernard Lyon 1,
CETHIL UMR5008, F-69621, Villeurbanne, France
romuald.rulliere@insa-lyon.fr; marc.clausse@insa-lyon.fr

Abstract - In this paper, the generation of a thermal shock in carbon dioxide is studied experimentally. The aim of the project is to improve the knowledge of a specific phenomenon during an hypothetical nuclear accident scenario, namely a fuel coolant interaction, by studying the rapid (few milliseconds) deposit of energy in a fluid (carbon dioxide). The deposit method chosen is the Joule effect in a thin tungsten wire. This kind of transient heat deposit in the fluid should imply a shock wave. A consistent visualization of the bubble formation and behaviour had been linked to energy deposit and pressure peaks.

Keywords**:** Thermal shock, Vaporization, Visualization, Phase change.