Contribution ID: **693** Type: **not specified**

P2.121 Visualisation of subcooled pool boiling in nanofluids

Tuesday, 18 September 2018 11:00 (2 hours)

High-performance cooling is of vital importance for the cutting-edge technology of today, from nanoelectronic devices to nuclear reactors. For fusion reactors, subcooled boiling heat transfer is expected to play a critical role for the safe and efficient operation of components exposed to high heat flux. Recent advances in nanotechnology have allowed the development of a new category of coolants, termed nanofluids, which exhibit superior thermophysical characteristics over traditional heat transfer fluids, including water. The present paper reports qualitative results of an experimental investigation of deionised water and Al2O3-H2O nanofluids under subcooled boiling conditions in a pool boiling cell. The purpose was to visually evaluate the impact of nanoparticles on the bubble dynamics and nucleation site activity at the heated surface—bare NiCr wire. It was observed that when nanoparticles are present, the nucleation site density, bubble size at departure and frequency of bubble generation from the surface of the heated wire are remarkably modified. Intense nanoparticle deposition on the heated wire surface was identified as a key mechanism for the observed differences, which altered surface structure and wettability of the wire. The outcome of this work is a step towards the evaluation of the applicability of nanofluids in cooling applications via boiling heat transfer.

Presenter: KOULOULIAS, Konstantinos (Mechanical Engineering Imperial College London)

Session Classification: P2