World Academy of Science, Engineering and Technology
International Journal of Materials and Metallurgical Engineering
Vol:12, No:05, 2018

# Rising of Single and Double Bubbles during Boiling and Effect of Electric Field in This Process

**Authors :** Masoud Gholam Ale Mohammad, Mojtaba Hafezi Birgani

**Abstract :** An experimental study of saturated pool boiling on a single artificial nucleation site without and with the application of an electric field on the boiling surface has been conducted. N-pentane is boiling on a copper surface and is recorded with a high speed camera providing high quality pictures and movies. The accuracy of the visualization allowed establishing an experimental bubble growth law from a large number of experiments. This law shows that the evaporation rate is decreasing during the bubble growth, and underlines the importance of liquid motion induced by the preceding bubble. Bubble rise is therefore studied: once detached, bubbles accelerate vertically until reaching a maximum velocity in good agreement with a correlation from literature. The bubbles then turn to another direction. The effect of applying an electric field on the boiling surface in finally studied. In addition to changes in the bubble shape, changes are also shown in the liquid plume and the convective structures above the surface. Lower maximum rising velocities were measured in the presence of electric fields, especially with a negative polarity.

**Keywords :** single and double bubbles, electric field, boiling, rising
**Conference Title :** ICCMT 2018 : International Conference on Chemical Metallurgy and Thermochemistry
**Conference Location :** Berlin, Germany
**Conference Dates :** May 21-22, 2018