Abstract Submitted
for the DFD08 Meeting of
The American Physical Society

Visualization study of the vapor bubble dynamics in the liquid nitrogen flow inside a small tube PENG ZHANG, XIN FU, RUZHU WANG, Shanghai Jiao Tong University — The vapor bubble nucleation, growing up and detachment in diabatic two-phase flow of liquid nitrogen in a vertically upward tube of 1.33 mm in diameter is experimentally investigated by employing high-speed visualization technique. It can be found from the experiments that the vapor bubble diameter increases linearly with the elapse of the time. The tube wall has the significant effect on the vapor growing up process. In the initial stage, the vapor bubble expands in both radial and axial directions; while the growing up of vapor bubble in radial direction is impeded and the growing up along the axial direction speeds up when the diameter of the vapor bubble equals the tube diameter. The flow reversal will appear when the expanding velocity of the vapor bubble is larger than that of the flow velocity. The nucleation sites display different characteristics in that the detachment of vapor bubbles from the nucleation sites downstream is more frequent and the diameter of the vapor bubble is smaller.

Peng Zhang
Shanghai Jiao Tong University

Date submitted: 01 Aug 2008 Electronic form version 1.4