Abstract Submitted
for the DFD15 Meeting of
The American Physical Society

Stability of surface nanobubbles SHANTANU MAHESHWARI, MARTIN VAN DER HOEF, Physics of Fluids, University of Twente, P.O. Box 217, 7500 AE, Enschede, The Netherlands, XUEHUA ZHANG, School of Civil, Environmental and Chemical Engineering, RMIT University, Melbourne, VIC 3001, Australia, DETLEF LOHSE, Physics of Fluids, University of Twente, P.O. Box 217, 7500 AE, Enschede, The Netherlands — We have studied the stability and dissolution of surface nanobubbles on the chemical heterogenous surface by performing Molecular Dynamics (MD) simulations of binary mixture consists of Lennard-Jones (LJ) particles. Recently our group has derived the exact expression for equilibrium contact angle of surface nanobubbles as a function of oversaturation of the gas concentration in bulk liquid and the lateral length of bubble. It has been showed that the contact line pinning and the oversaturation of gas concentration in bulk liquid is crucial in the stability of surface nanobubbles. Our simulations showed that how pinning of the three-phase contact line on the chemical heterogenous surface lead to the stability of the nanobubble. We have calculated the equilibrium contact angle by varying the gas concentration in bulk liquid and the lateral length of the bubble. Our results showed that the equilibrium contact angle follows the expression derived analytically by our group. We have also studied the bubble dissolution dynamics and showed the "stick-jump" mechanism which was also observed experimentally in case of dissolution of nanodrops.

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Date submitted: 28 Jul 2015 Electronic form version 1.4