

Accepted Manuscript

Title: Bubble Rubbing on Hydrophobic Solid Surface

Authors: Stoyan I. Karakashev, Klaus W. Stöckelhuber, Roumen Tsekov, Nikolay Grozev, Silviya Simeonova, Nirav Raykundaliya, Gert Heinrich



PII: S0927-7757(18)30642-3
DOI: <https://doi.org/10.1016/j.colsurfa.2018.07.037>
Reference: COLSUA 22692

To appear in: *Colloids and Surfaces A: Physicochem. Eng. Aspects*

Received date: 7-4-2018
Revised date: 18-7-2018
Accepted date: 19-7-2018

Please cite this article as: Karakashev SI, Stöckelhuber KW, Tsekov R, Grozev N, Simeonova S, Raykundaliya N, Heinrich G, Bubble Rubbing on Hydrophobic Solid Surface, *Colloids and Surfaces A: Physicochemical and Engineering Aspects* (2018), <https://doi.org/10.1016/j.colsurfa.2018.07.037>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Bubble Rubbing on Hydrophobic Solid Surface

Stoyan I. Karakashev^{1*}, Klaus W. Stöckelhuber², Roumen Tsekov¹, Nikolay Grozev¹, Silviya Simeonova¹, Nirav Raykundaliya³ and Gert Heinrich²,

¹Department of Physical Chemistry, Sofia University, 1164 Sofia, Bulgaria, E-mails: fhsk@chem.uni-sofia.bg (S. I. Karakashev), fhrt@chem.uni-sofia.bg (R. Tsekov), fhng@chem.uni-sofia.bg (N. Grozev), fhsss@chem.uni-sofia.bg (S. Simeonova)

² Leibniz Institute for Polymer Research, Dresden, D-01067 Dresden, Germany, E-mails: stoeckelhuber@ipfdd.de (K.W. Stöckelhuber), gheinrich@ipfdd.de (G. Heinrich).

³Marvadi Educational Foundation, Rajkot, Gujarat, India, E-mail: nirav.ray@gmail.com

Abstract

This is original study on ruptured bubble rubbing on hydrophobic solid surface. A bubble protruding from capillary tube attached to the objective of a microscope was pressed gently against hydrophobic solid surface by gradually increase of the pressure inside of the capillary tube. At certain special “gap” value of the pressure inside of the capillary tube formation of wetting film was observed interferometrically. The film ruptured a short time after its formation, thus developing three-phase contact line (TPCL) on the solid surface. TPCL rubs on the surface when the latter moves tangentially. At certain critical speed of motion of the solid surface the bubble detaches from the surface. The value of this critical speed depends on the pressure inside of the bubble, the level of the hydrophobicity and the visco-elastic modulus of the surface. We call for further investigations of this interesting phenomenon.

Keywords: Thin wetting films, Tribology, Friction, Lift force, Interferometry, Bubble

*Corresponding author: Department of Physical Chemistry
1 James Bourchier Blvd
Sofia 1164
Bulgaria
Tel. +359 28161283
E-mail: fhsk@chem.uni-sofia.bg

Download English Version:

<https://daneshyari.com/en/article/6977233>

Download Persian Version:

<https://daneshyari.com/article/6977233>

[Daneshyari.com](https://daneshyari.com)