

NanoScience and Technology

Fundamentals of Friction and Wear

von
Enrico Gnecco, Ernst Meyer

1. Auflage

Springer-Verlag Berlin Heidelberg 2006

Verlag C.H. Beck im Internet:
www.beck.de
ISBN 978 3 540 36806 9

Zu [Leseprobe](#)

schnell und portofrei erhältlich bei beck-shop.de DIE FACHBUCHHANDLUNG

Contents

Experimental Techniques

Friction Force Microscopy

<i>Bennewitz</i>	1
------------------------	---

Surface Forces Apparatus in Nanotribology

<i>Hammond, P. Richetti</i>	15
-----------------------------------	----

The quartz crystal microbalance

Nanotribology technique

<i>Buschi, G. Mistura</i>	35
---------------------------------	----

Nanoscale Friction and Ultrasonics

<i>Cuberes</i>	49
----------------------	----

Probing of Nanocontacts Inside

Transmission Electron Microscope

<i>Buschi, A. Lõhmus, J.D. Holmes, H. Olin</i>	73
--	----

Friction on the Atomic Scale, Superlubricity

Stick-Slip Motion on the Atomic Scale

<i>Pyralog, E. Gnecco, E. Meyer</i>	101
---	-----

Velocity dependence of atomic friction:

Theory and beyond

<i>Yastigneev, P. Reimann</i>	117
-------------------------------------	-----

The Basic of Nanoscale Friction and Ways to Control it

<i>Hammer, M. Urbakh</i>	143
--------------------------------	-----

Experimental Observations of Superlubricity

Thermolubricity

<i>Hammer, J.W.M. Frenken</i>	159
-------------------------------------	-----

Contents

Theoretical Aspects of Superlubricity	
<i>I. Müser</i>	177
First-Principles Atomic-Scale Study of Superlow Friction	
<i>Viraci, S. Dag, O. Gulseren, T. Yildirim</i>	201
Contact Mechanics on the Nanoscale	
NanoMechanics: Elasticity in Nano-Objects	
<i>Merchan, R. Szoszkiewicz, E. Riedo</i>	219
Mechanical Properties	
Metallic Nanojunctions	
<i>Rubio-Bollinger, J.J. Riquelme, N. Agraït, S. Vieira</i>	255
Contact Mechanics, Friction and Adhesion	
in Application to Quasicrystals	
<i>C.J. Persson, G. Carbone, V.N. Samoilov, I.M. Sivebaek, Fartaglino, A.I. Volokitin, C. Yang</i>	269
A Multiscale Molecular Dynamics Approach	
Contact Mechanics and Friction: From Continuum	
Mechanics to Molecular Dynamics	
<i>Fartaglino, C. Yang, B.N.J. Persson</i>	307
The Role of Nanoroughness in Contact Mechanics	
<i>Buzio, U. Valbusa</i>	345
Dissipation Mechanisms at Finite Separations	
Energy Dissipation and Nanoscale Imaging	
Tapping Mode AFM	
<i>García, N.F. Martínez, C.J. Gómez, A. García-Martín</i>	361
Mechanisms of atomic scale dissipation at close approach	
dynamic atomic force microscopy	
<i>Trevethan, L. Kantorovich</i>	373
Theory of Noncontact Friction	
<i>Volokitin, B.N.J. Persson</i>	393
Dissipation at large Separations	
<i>East, U. Gysin, E. Meyer, D.W. Lee</i>	439

Friction and Fracture on the Nanoscale

Surface-Damage Mechanisms: from Nano-Microcontacts to Wear of Materials	
<i>Polato</i>	453

Single Asperity Nanometer-Scale Studies in Surface Biochemistry	
<i>Dickinson</i>	481

Nanotribology of MEMS/NEMS	
<i>Khanna, J.-P. Celis</i>	521

Nanotribology in Automotive Industry	
<i>Wienwiebel, M. Scherge</i>	549

Manipulation of Nanoparticles

Nanotribological Studies by Nanoparticle Manipulation	
<i>Schwarz, C. Ritter, M. Heyde</i>	561

Mechanical Properties of Carbon Nanotubes	
<i>Kulik, A. Kis, B. Lukic, K. Lee, L. Forró</i>	583

Theory of Adsorption and Manipulation of Molecules on the Si(001) Surface	
<i>Artsinovich, C. Hobbs, L. Kantorovich, P. Beton</i>	601

Friction in Polymeric Materials

Nanoscale Friction of Self-assembled Monolayers	
<i>Benjamin, H. Haidara</i>	619

Sliding Friction of Polymers: The Complex Role of Interface	
<i>Stroobants, M. Schmitt, A. Ghorbal</i>	647

Molecular Origins of Elastomeric Friction	
<i>Stroobants, K. Vorvolakos, K. Chaudhury, R.M. Overney</i>	659

Nanotribological Perspectives in Tissue Engineering	
<i>Di Giuseppi, G. Ciardelli, A. Rechichi, F. M. Montevercchi, P. Giusti</i>	677