

## Introduction: Surface and Interface Science in the New Millennium

Surfaces: a playground for physics with broken symmetry in reduced dimensionality E.W. Plummer, Ismail, R. Matzdorf, A.V. Melechko, J.P. Pierce and J. Zhang		1
Biomedical surface science: Foundations to frontiers D.G. Castner and B.D. Ratner	biomedical surface science	28
The role of surface science in bioengineered materials M. Tirrell, E. Kokkoli and M. Biesalski		61
<b>Fundamental Phenomena at Surfaces and Interfaces</b>		
Electronic transport at semiconductor surfaces—from point-contact transistor to micro-four-point probes S. Hasegawa and F. Grey	electron transport	84
Dynamical phenomena including many body effects at metal surfaces W.A. Diño, H. Kasai and A. Okiji		105
Statistical thermodynamics of soft surfaces S.A. Safran		127
Solved and unsolved problems in surface structure determination D.P. Woodruff		147
Magnetism in low dimensionality S.D. Bader	magnetism	172
<b>New Materials via Surface Processing</b>		
Molecular beam epitaxy J.R. Arthur	will be covered in my lectures, do not choose	189
Carbon nanotubes: opportunities and challenges H. Dai	carbon nanotubes	218
Clusters as new materials W. Eberhardt	will be covered in my lectures, do not choose	242
Clusters and islands on oxides: from catalysis via electronics and magnetism to optics H.-J. Freund	more applied story on clusters	271
Tailoring magnetism in artificially structured materials: the new frontier J. Shen and J. Kirschner		300
<b>Frontiers in the Modeling of Surface Processes</b>		
Modeling the full monty: baring the nature of surfaces across time and space F. Starrost and E.A. Carter		323

The virtual chemistry lab for reactions at surfaces: Is it possible? Will it be useful? A. Groß	347
Catalysis and corrosion: the theoretical surface-science context C. Stampfl, M.V. Ganduglia-Pirovano, K. Reuter and M. Scheffler	368
<b>Surface Dynamics, Growth and Etching</b>	
Atomic description of elementary surface processes: diffusion and dynamics F. Rosei and R. Rosei	395
Fidgety particles on surfaces: how do they jump, walk, group, and settle in virgin areas? A.G. Naumovets and Z. Zhang	414
Epitaxy: the motion picture P. Finnie and Y. Homma	437
Understanding crystal growth in vacuum and beyond E. Vlieg	458
Real time chemical dynamics at surfaces M. Bonn, A.W. Kleyn and G.J. Kroes	475
The growth and modification of materials via ion-surface processing L. Hanley and S.B. Sinnott	500
Sputtering: the material erosion tool M.V. Ramana Murty	523
<b>Surface Science Tools and their Applications</b>	
Probing buried interfaces with non-linear optical spectroscopy C.T. Williams and D.A. Beattie	545
Frontiers in infrared spectroscopy at surfaces and interfaces C.J. Hirschmugl	577
Surface science done at third generation synchrotron radiation facilities S. Ferrer and Y. Petroff	605
Low temperature surface chemistry and nanostructures G.B. Sergeev and T.I. Shabatina	628
<b>The Surface Science of Biomaterials and Processes</b>	
Biological surface science B. Kasemo	656
The surface science of enzymes T.H. Rod and J.K. Nørskov	678
Computation with DNA on surfaces S.D. Gillmor, P.P. Rugheimer and M.G. Lagally	699
<b>Influence of Surface Science on other Disciplines</b>	
An atomistic view of electrochemistry D.M. Kolb	722

atomic view of epitaxy

using ion beams to modify surfaces

will be covered in my lectures, do not choose

surface science of electrochemistry

Surface science and the atomic-scale origins of friction: what once was old is new again J. Krim	understanding friction	741
The surfaces of compact systems: from nuclei to stars R.A. Broglia		759
Cosmic dust and our origins J.M. Greenberg	astronomy	793
It's a dusty Universe: surface science in space D.A. Williams and E. Herbst	astronomy	823
Far-out surface science: radiation-induced surface processes in the solar system T.E. Madey, R.E. Johnson and T.M. Orlando	planetary science	838
<b>Influence of Surface Science on Technology</b>		
The surface science of semiconductor processing: gate oxides in the ever-shrinking transistor M.K. Weldon, K.T. Queeney, J. Eng Jr., K. Raghavachari and Y.J. Chabal		859
Organic functionalization of group IV semiconductor surfaces: principles, examples, applications, and prospects S.F. Bent		879
Surfaces and interfaces in polymer-based electronics M. Fahlman and W.R. Salaneck	polymer based electronics	904
Role of surface science in catalysis J.H. Sinfelt	history of catalysis using surfaces	923
The surface chemistry of catalysis: new challenges ahead F. Zaera	case studies of catalysis	947
Impact of surface science on the understanding of kinetics of heterogeneous catalytic reactions V.P. Zhdanov		966
Role of surface and interface science in chemical vapor deposition diamond technology L.K. Bigelow and M.P. D'Evelyn	surface science of artificial diamonds	986
The surface science of xerography C.B. Duke, J. Noolandi and T. Thieret	surface science of photocopying	1005
Practical surfaces: beyond the wheel S.S. Badesha and J.A. Swift		1024
Author index		1042
Subject index		1044
Materials index		1051