

NOVA ACTA LEOPOLDINA

Abhandlungen der Deutschen Akademie der Naturforscher Leopoldina

Im Auftrage des Präsidiums herausgegeben von

HARALD ZUR HAUSEN

Vizepräsident der Akademie

NEUE FOLGE

NUMMER 340

BAND 92

From Nanoscience to Nanotechnology

Leopoldina Symposium

Forschungszentrum Karlsruhe

September 4 to 5, 2003

Organizing Committee:

Herbert GLEITER (Karlsruhe)

Member of the Academy

Roland WIESENDANGER (Hamburg)

Member of the Academy

With 26 Figures and 1 Table

TECHNISCHE
INFORMATIONSBIBLIOTHEK
UNIVERSITÄTSBIBLIOTHEK
HANNOVER



Deutsche Akademie der Naturforscher Leopoldina, Halle (Saale) 2005
In Kommission bei Wissenschaftliche Verlagsgesellschaft mbH Stuttgart

Contents

BERG, Gunnar: Welcome Greetings	7
HILGER, Almuth, HOFE, Thomas VON, and KREIBIG, Uwe: Recent Investigations of Size and Interface Effects in Nanoparticle Composites	9
LAURITSEN, Jeppe V., and BESENBACHER, Flemming: New Insight into Nanocatalysis from Atom-resolved Scanning Tunneling Microscopy.	21
RIEDER, Karl-Heinz, MEYER, Gerhard, HLA, Saw-Wai, MORESCO, Francesca, BRAUN, Kai F., MORGENSTERN, Karina, REPP, Jascha, FOELSCH, Stefan, and BARTELS, Ludwig: The Scanning Tunneling Microscope as Operative Tool: Doing Physics and Chemistry with Single Atoms and Molecules	29
SCHEER, Elke: Electronic Transport through Atomic-size Contacts	37
WEBER, Heiko B., MAYOR, Marcel, and LÖHNEYSSEN, Hilbert VON: Electrical Current through Single Molecules	47
GAREEV, Rashid R., POHLMANN, Lars L., BÜRGLER, Daniel E., and GRÜNBERG, Peter A.: Interlayer Exchange Coupling of Fe Films across Si Tunnel Barriers	55
BODE, Matthias, RAVLIĆ Robert, KLEIBER, Michael, and WIESENDANGER, Roland: Spin-polarized Scanning Tunneling Microscopy of Antiferromagnetic Surfaces	61
GOTSMANN, Bernd, ALBRECHT, Thomas R., BINNIG, Gerd K., DESPONT, Michel, DRECHSLER, Ute, DÜRIG, Urs, JUBIN, Daniel, HÄBERLE, Walter, LANTZ, Mark A., ROTHUIZEN, Hugo, STUTZ, Richard, VETTIGER, Peter, WIEMANN, Dorothea, (<i>Micro-/Nanomechanics Group</i>), and BÄCHTOLD, Peter, CHERUBINI, Giovanni, DHOLAKIA, Ajay, ELEFThERIOU, Evangelos, HAGLEITNER, Christoph, LOELIGER, Teddy, PANTAZI, Aggeliki, POZIDIS, Haris, (<i>Advanced Storage Technologies Group</i>): A Nanotechnology Approach to Data Storage	69
ALIVISATOS, Paul: Nanocrystals as a New Class of Macromolecules	75
ROTH, Siegmar: Carbon Nanotubes – from Science to Applications	77
WELLER, Horst: Synthesis, Properties and Self-Assembly of Nanoparticles	79
HECKL, Wolfgang M.: Molecular Self-Assembly – A Key Technology in Nanoscience and Templating.	81

FROMHERZ, Peter: Brainchips – from Nano to Milli	83
KRONMÜLLER, Helmut: Magnetic Structures and Magnetization Processes in Small Particles and Thin Films	85
WELLAND, Mark: Novel Methods for Fabrication of Nanostructures	87
GÖSELE, Ulrich: Nanosilicon	89
HAHN, Horst, and STAHL, Branko: Bioreceptors as Model Systems for Functional Nanostructures	91
GORNIK, Erich: Current and THz Spectroscopy of Quantum States	93
WOLF, Dieter: Dislocation and Grain-Boundary Deformation Processes in Nano- crystalline Materials by Multiscale Computer Simulation	95