



APPLICATIONS OF NANOMECHANICAL TESTING

3rd European Symposium on Nano-Mechanical Testing

in Hückelhoven / Germany

organised by

SURFACE

and



nanotechnologie

CC "Ultradünne funktionale Schichten"

Preliminary Program:

Tuesday 17.09.2002

7:30 p.m. Welcome Reception: Poster Session

Wednesday 18.09.2002

8:30 a.m. Opening

Applications in Semiconductor Industry

8:40a.m. High Throughput Screening of Functional Materials and Electrical Impedance Mapping using Evanescent Microwave Probe **(key note lecture)**

Xiao-Dong Xiang, Ariel Technologies, Inc.

9:30a.m. Accelerated Design of Coatings – Mechanical Properties determined by local measurements of nano-hardness on thin films with internal composition gradients

Raphael Mertens*, Ude D. Hangen, Jochen Schneider*;**

***)MCH, University of Technology, Aachen-Germany **)SURFACE, Hückelhoven-Germany**

9:55a.m. nano-Indentation on low-k Dielectrics

Sywert Brongersma, IMEC, Leuven-Belgium

10:20a.m. Quantitative 3D Deformation Analysis and Analysis and determination of Fracture Parameters from AFM Images

D. Vogel, J. Keller, A. Gollhardt, B. Michel, Fraunhofer IZM, Berlin-Germany

coffee break 10:20-10:50 a.m.

Fundamentals of the indentation Process

- 10:50a.m. Approaches of hardness inference from Load-Depth-Data
B. Wolf, R. Ries, A. Richter, Technische Fachhochschule Wildau, Wildau-Germany
- 11:15a.m. Critical Examination based on experimental measurements, of the fundamental relations used in nanoindentation
M. Martin and M. Troyon, Université de Reims, Reims-France.
- 11:40p.m. On the origins and modelling of ISE
Steve Bull, University of Newcastle, Newcastle-U.K.
- 12:05p.m. Dislocation nucleation and elastic anisotropy of monocrystals
P. Grau, H. S. Leipner, D. Lorenz, A. Zeckzer, Martin-Luther-Universität, Halle-Germany

Lunch 12:30-1:30 p.m.

Thin Films Testing

- 1:30p.m. Identification of Elastic-Plastic Mechanical Properties of Thin Metal Films from NanoIndentation Experiments using Neuronal Networks
N. Huber, IMF II, Forschungszentrum Karlsruhe, Karlsruhe-Germany
- 1:55p.m. Parameters affecting the determination accuracy of thin hard coatings stress strain laws by means of nanoindentations
K.-D. Bouzakis¹, N. Michailidis¹, S. Hadjiyiannis¹, G. Skordaris¹, G. Erkens²; ¹ Aristoteles University of Thessaloniki, Thessaloniki-Greece ² CemeCon GmbH, Würselen-Germany
- 2 :20p.m. Modulus measurements at ultra thin Coatings
T. Chudoba¹, D. Schneider², M. Griepentrog¹; ¹BAM, Berlin, ²IWS, Dresden -Germany
- 2:45p.m. nano-mechanical Testing of thin films at elevated temperatures
J.F. Smith, B. Beake, S.R.Goodes; Micro Materials Limited, Wrexham, U.K.

coffee break & poster session 3:10-5:00 p.m.

- 5.00p.m. Nanomechanical Fracture Testing for Assessing the Durability of Hybrid Microcircuit Films
N. R. Moody, D. P. Adams*, N. Y. C. Yang, A. A. Volinsky, W. W. Gerberich*****
Sandia National Laboratories, Livermore, *Sandia National Laboratories, Albuquerque
****Motorola, Mesa., ***University of Minnesota, Minneapolis, USA (invited video conf.)**
- 5:45p.m. In-situ Acoustic Emission monitoring of nanoIndentation /scratch
U. Volz¹, P. DeWolf¹, L. Kuhn²;
¹Veeco Metrology GmbH, Mannheim-Germany; ²Hysitron, Inc., Minneapolis-USA

7:30p.m. shuttle to conference dinner...

Thursday 19.09.2002

Polymers

- 9:00a.m. Dynamic Mechanical Analyses of Polymers (invited)
Kathryn J. Wahl and S.A. Syed Asif,*,
Naval Research Laboratory, Washington-USA, *Hysitron, Inc., Minneapolis-USA
- 9:50a.m. Dynamic nano-indentation as a tool for determining the visco-elastic moduli of thin polymer films and coatings
A.A. Goruppa, S. A. Hayes and F. R. Jones; Sheffield University, U.K.
- 10:15a.m. Indentation Tests on Carbon Black Filled Elastomers from the Nano- to the Microscale
V. Herrmann, K. Unsel, Dunlop GmbH, Hanau-Germany
- 10:40a.m. Nanoindentation on the nanopatterned surfaces of polymers.
Marigo Stavridi, Yannis F. Missirlis, University of Patras, Patras-Greece

break 11 :05-11 :30a.m.

- 11:30a.m. Quantification of Craze-initiation in glassy polymers using nanoindentation
J. den Toonder¹, H. van Melick², O. Bressers², L. Govaert², H. Meijer²
¹Philips Research Laboratories, Eindhoven-The Netherlands
²Eindhoven University of Technology, Eindhoven-The Netherlands
- 11:55a.m. Single Molecule Mechanical Testing
S. Vinzelberg¹, Roger Proksch² & Jason Cleveland²
¹Atomic Force F&E GmbH, Mannheim-Germany, ²Asylum Research Corp., Santa Barbara-USA

Lunch 12:20-2:00p.m.

Thin films and bulk materials: Hardness-Friction-Wear

- 2:00p.m. Alloying effects in metallic materials studied with nanoindentation
M. Göken, K. Durst, Universität des Saarlandes, Saarbrücken-Germany
- 2:25p.m. nanoIndentation Testing of Gear Steels
A. Oila and S.J. Bull, University of Newcastle, Newcastle-U.K.
- 2:50p.m. Interpretation of Microwear Experiments on thin DLC coatings:
Friction, Wear and Plastic Deformation
K. I. Schiffmann, Fraunhofer Institut f. Schicht- u. Oberflächentechnik, Braunschweig-Germany
- 3:15p.m. Mechanically Induced Anisotropic Molecular Migrations and Anisotropic Scratch Resistance in Organic Crystals
G. Kaupp, M.R. Naimi-Jamal, Universität Oldenburg, Oldenburg - Germany
- 3:40p.m. Scratch resistance testing of thin lacquer
U. Hangen, SURFACE, Hückelhoven-Germany

Posters will be accepted until 1.September 2002:

Posters accepted by the 30st of April

- (1) Metals in the Jaws of Marine-Worms - an Alternative Concept for Improving Mechanical Properties
Thomas Schöber¹, Helga C. Lichtenegger², J. Herbert Waite² & Galen D. Stucky²
1 Erich Schmid Institute, University of Leoben, Austria, 2 University of California Santa Barbara, USA
- (2) Hardness measurements of irradiated glass samples
P. Nagy, Hungarian Academy of Sciences, Chemical Research Center, Budapest-Hungary
- (3) Investigation of the properties of candidate reference materials suited for the calibration of nanoindentation instruments
K. Herrmann¹, N.M.J. Jennett², S. Kuypers³, I. McEnteggart⁴, C. Ingelbrecht⁵, U. Hangen⁶, T. Chudoba⁷, F. Pohlenz¹, F. Menelao¹; 1: PTB Braunschweig
- (4) On-Site direct calibration of a Hysitron Transducer
U. Hangen et al., SURFACE