

Materials Research in an Aberration-Free Environment

July 31 - August 1, 2004

**Oglethorpe Auditorium, Savannah Convention Center
Savannah, Georgia**



2004 Focused Interest Group Pre-Congress Meeting

Organizer

Christian Kisielowski

National Center for Electron Microscopy, Lawrence Berkeley National Laboratory

PROGRAM

Materials Research in an Aberration-Free Environment

Saturday, July 31, 2004

8:15– 8:30 am

“Welcome and Introduction”

C. Kisielowski, NCEM, Lawrence Berkeley National Laboratory

Improvements in STEM and TEM Instrumentation for Materials Science Applications

8:30– 9:00 am

“Design of an electron optical system for Cc correction”

M. Haider, CEOS, Germany

9:00 – 9:30 am

“First experimental proof of spatial resolution improvement in a monochromized and Cs-corrected TEM”

B. Freitag et al., FEI Electron Optics, The Netherlands

9:30 – 10:00 am

“Sub-Angstrom and sub-eV resolution with the analytical SATEM”

G. Benner et al., Zeiss, Germany

10:00 – 10:30 Coffee Break

10:30 – 11:00 am

“A new double-corrected HREM/STEM and its applications for advanced materials research”

J.L. Hutchison et al., University of Oxford, UK

11:00 – 11:30 am

“Measuring physical properties at the sub-nm scale in a STEM: the Orsay SuperSTEM project”

Gloter et al. Université Paris Sud, France

11:30– 12:00 am

“Materials applications of aberration-corrected STEM”

S. Pennycook, Oak Ridge National Laboratory, USA, and O. Krivanek, NION, USA

12:00 – 1:30 pm Lunch Break

Prospects for Dynamic Experiments

B. Kabius (chair)

1:30 – 2:00 pm

“Toward ultrafast electron microscopy”

W. King, Lawrence Livermore National Laboratory, USA

2:00 – 2:30 pm

“Magnetic imaging of information storage materials”

A. Petford-Long, University of Oxford, UK

2:30 – 3:00 pm

“HRTEM image simulation of carbon nanotubes in an actual growth environment”

S. Takeda et al., University of Osaka, Japan

3:00 – 3:30 pm Coffee Break

3:30 – 4:00 pm

“In-situ experiments in the high-voltage microscope in Stuttgart - need for better resolution”

M. Ruehle, MPI Stuttgart, Germany

4:00 – 4:30 pm

“To correct or not to correct? Strategies if you do and strategies if you don't”

R. Dunin-Borkowski, University of Cambridge, UK

4:30 – 5:00 pm

“Aberration-corrected electron microscopy in nanocatalysis”

Pratibha L. Gai, DuPont and University of Delaware, Newark, USA

5:30 – 7 :00 pm Posters & Refreshments

Sunday, August 1, 2004

R. Phaneuf (chair)

8:30– 9:00 am

“Correction of spherical aberration in a focused ion beam system by means of space charge”

J. Orloff, University of Maryland, USA

9:00 – 9:30 am

“Outline of the mirror corrector for SMART and PEEM3”

H. Rose, University of Darmstadt, Germany

9:30 – 10:00 am

“Prospects for aberration corrected nanocrystallography”

L. D. Marks, C. S. Own and W. Sinkler, Northwestern University, USA

10:00 – 10:30 Coffee Break

10:30 – 11:00 am

“Monochromated ELS: history, context and opportunities.”

J.C.H. Spence et al., Arizona State University and Lawrence Berkeley National Laboratory, USA

11:00– 11:30 am

“Developments in XEDS and SCEM as they relate to aberration corrected microscopes”

N. Zaluzec, Argonne National Laboratory, USA

11:30 – 1:00 pm Lunch Break

Addressing Limits: Single Atom Detection

C. Kisielowski (chair)

1:00 – 1:30 pm

“Quantitative aberration-corrected transmission electron microscopy”

K. Urban, Institut für Festkörperforschung and Ernst Ruska-Centrum, Jülich, Germany

1:30 – 2:00 pm

“Electron holography with Cs-corrected TEM”

H. Lichte et al., Institute of Structure Physics, Dresden University, Germany

2:00 – 2:30 pm

"Direct and indirect aberration correction and compensation for sub Ångstrom imaging"

A.I. Kirkland, University of Oxford, UK

2:30 – 3:00 pm Coffee Break

3:00 – 3:30 pm

“Prospects for bright field and dark field electron tomography on a discrete grid”

J. Jinschek et al., Lawrence Berkeley National Laboratory, USA

3:30 – 4:00 pm

“A sharper view of randomness? What aberration-corrected imaging of amorphous materials can reveal”

M. Treacy, Arizona State University. USA

4:00 – 4:30 pm

“Atomic resolution electron tomography: a dream?”

D. Van Dyck, University of Antwerp, Belgium

4:30 - 5:00 pm

Conference summary

Posters

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Image-based nanocrystallography by means of transmission electron goniometry

Peter Moeck *, Bjoern Seipel *, Wentao Qin **, Philip B. Fraundorf ***

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*** Physics and Astronomy and Center for Molecular Electronics, University of Missouri at St. Louis, MO 63121

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A new approach for electron tomography: ADF-TEM

S. Bals, V. Radmilovic, Q. Yang and C. Kisielowski

Ernest Orlando Lawrence Berkeley National Laboratory, National Center for Electron Microscopy, Berkeley, CA 94720, USA

P3

Potential for optical sectioning in aberration-corrected Z-contrast STEM

P. M. Voyles

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1509 University Avenue, Madison, WI 53706, U.S.A.

P4

Erosion of TEM specimens in an intense electron beam

R.F. Egerton* and P.A. Crozier**

* Physics Department, University of Alberta, Edmonton, Canada T6G 2J1.

** Center for Solid State Science, Arizona State University, Tempe, AZ 85281, USA

P5

In Situ PEEL spectroscopic determination and EFTEM imaging of multiple materials properties at the nanoscale using universality and scaling in solid-state property-plasmon energy relationships: new capabilities for analytical electron microscopy

V.P. Oleshko and J.M. Howe

University of Virginia, Department of Materials Science & Engineering, Charlottesville, VA 22904

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The possibility of TEM-based X-ray microanalysis with a microcalorimeter Detector

E.A. Kenik,* I.M. Anderson,* D.C. Joy* & ** and H. Demers*&***

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**Electron Microscopy Facility, University of Tennessee, Knoxville TN 37996-0840

***Dept of Mining, Metals and Mat. Eng., McGill University, Montréal, Québec, Canada H3A 2B2

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The dynamics of nano-oxidation reactions visualized by in situ UHVTEM

Judith C. Yang

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P8

Outlook of application of aberration corrected electron microscopy in ligand-protected metal clusters

Huiping Xu*, Ray D. Twisten**, Laurent Menard***, Anatoly Frenkel****, Ralph Nuzzo***, Duane Johnson*****, Judith C. Yang *

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Retrieving potential maps from reversed multislice calculations

Fu-Rong Chen,* Christian Kisielowski,** Joerg R. Jinschek,** Juergen Plitzko,*** and Ji-Jung Kai *

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*** Max-Planck-Institut für Biochemie, Am Klopferspitz 18, D-82152 Martinsried, Germany

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Sub-Ångstrom metrology of resolution in aberration-corrected transmission electron microscopes using the A-OK standard test specimens

Lawrence F. Allard* and Michael A. O'Keefe**

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Sub-Ångstrom resolution with aberration-corrected TEM: present and future

Michael A. O'Keefe

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