

## CURRICULUM VITAE: Laurence Daniel MARKS

**Date of Birth:** 4 July 1954

**Education:** 1973-1976 University of Cambridge, B.A. 1976  
1976-1980 Research student at the Cavendish Laboratory,  
Cambridge  
1980 Ph.D., University of Cambridge  
Thesis entitled "The structure of small silver  
particles"

**Professional Career:**

1980-1983 Post doctoral research assistant  
Cavendish Laboratory (Dept. of Physics),  
University of Cambridge  
1983-1985 Post doctoral research assistant, Department of  
Physics Arizona State University  
March 1985 Assistant Professor  
June 1986 Associate Professor  
June 1992- Professor, Department of Materials, Science &  
Engineering, Northwestern University

**Email** [L-marks@northwestern.edu](mailto:L-marks@northwestern.edu)

**Web** [www.numis.northwestern.edu](http://www.numis.northwestern.edu)

**Google Scholar** [scholar.google.com/citations?user=zmHhI9gAAAAJ&hl=en](https://scholar.google.com/citations?user=zmHhI9gAAAAJ&hl=en)

**Awards and Honors:**

ICSOS Surface Structure Prize, 2017  
Fellow, Microscopy Society of America, 2017  
Astor Visiting Lecturer, University of Oxford, 2015  
Warren Award, American Crystallographic Association, 2015  
Fellow, American Physical Society, 2001  
Burton Medal, Electron Microscopy Society of America, 1989  
Sloan Foundation Fellowship 1987  
Scholarship, Kings College, University of Cambridge 1976

**Current Research Interests:**

**Electron Microscopy**

Precession Electron Diffraction; Surface Imaging in an Electron Microscope; Dynamical  
Diffraction; In-Situ Microscopy; Direct Methods for Bulk Materials; Charge Density  
Measurements

**Density Functional Theory**

Mixing and Optimization Algorithms, Oxide Surfaces, Flexoelectric Effects

**Oxide Surfaces**

Structure, Kinetics and Energetics of Oxide Surfaces; Predictive Rules for Oxide  
Surfaces; Direct Methods with Electrons or X-rays; Corrosion

**Tribology**

The Role of Dislocations in Nanoscale Tribological Properties; In-Situ Tribology; Metal-on-Metal Hip Replacements

### **Nanoparticles**

Role of structure and shape on surface plasmonics; nucleation and growth of nanoparticles; thermodynamics and Wulff constructions; Catalysis; Nanoplasmonics.

### **Corrosion**

Understanding the early stages of corrosion, both high temperature oxidation and aqueous; Solute Trapping; Cabrera-Mott models; Morphological Instabilities

### **Main Current External Committees**

IUCR, Program Committee

ICSOSS, Program Committee

Commission on Electron Crystallography of IUCR

Co-Editor, Acta Cryst A

US National Crystallography Committee

### **PhD Students**

**Ajayan, Pulichek** (1989), *Phase instabilities in small particles.*

**Ma, Yiquan** (1990) *Dynamical theory for high energy electron reflection.*

**Bonevich, John** (1991), *Atomic structure and sintering behavior of ultrafine ceramic particles.*

**Buckett, Mary** (1991), *Electron radiation damage in transition metal oxides.*

**Derren Dunn** (1992) *Ultra high vacuum transmission electron microscopy of the clean surfaces of Au and Ir (001).*

**Ai, Rebecca** (1992), *Electron-induced surface radiation damage in  $V_2O_5$ ,  $ReO_3$  and  $CaF_2$ .*

**Narayanaswamy, Dorai** (1995) *Morphology transformations in nanoparticles.*

**Jayaram, Ganesh** (1995) *Ultrahigh vacuum transmission electron microscopy studies of semiconductor surfaces.*

**Vuchic, Boris** (1995) *The formation, transport properties and microstructure of  $45^\circ$  [001] tilt grain boundaries in  $YBa_2Cu_3O_{7-x}$  thin films.*

**Plass, Richard** (1996) *Gold induced Si(111) surface reconstructions studied by ultrahigh vacuum transmission electron microscopy.*

**Storey, Brad** (1996) *Microstructure and composition of magnetic flux pinning defects in high-temperature superconductors.*

**Collazo-Davila, Christopher** (1998) *Initial stages of thin film deposition : metal-induced surface reconstruction on semiconductors and the nucleation of cubic boron nitride.*

**Landree, Eric** (1998) *Structural and chemical characterization of thin films and crystal surfaces.*

**Bengu, Erman** (2000) *Experimental and computational study of surfaces, interfaces and thin films.*

**Grozea, Daniel** (2000) *Initial growth of ultrathin metal films on semiconductors.*

**Carmody, Michael** (2000) *The local variation of the critical current along YBa<sub>2</sub>Cu<sub>3</sub>O<sub>7-x</sub> grainboundary and ramp-edge Josephson junctions.*

**Li, Quan** (2001) *Nucleation and growth of metastable phases in thin films.*

**Erdman, Natasha** (2002), *Structure, morphology and chemistry of catalytic transition metal oxides.*

**Edy Widjaja** (2004) *Quasicrystalline thin films : growth, structure and interface.*

**Arun Subramanian** (2004) *Charge Density at Oxide Surfaces*

**Ann Chiaramonti** (2005) *Surfaces of Catalytically Relevant Oxides*

**Chris Own** (2005) *Precession Electron Diffraction*

**Yingmin Wang** (2006) *Catalysis by Gold Nanoparticles*

**Arno Merkle** (2006) *Nanotribology*

**Courtney Lanier** (2007) *Real and Model Oxide Surfaces*

**Robin Koshy** (2008) *Thermally Activated Self-lubricating Nanostructured Coating for Cutting Tool Applications*

**Paramita Mondal** (2008) *Nanoscale Properties and Mechanics of Cementitious Materials*

**James Ciston** (2009) *Crystallographic perturbations to valence charge density and hydrogen-surface interactions*

**James Enterkin** (2010) *A Chemical Approach to Understanding Oxide Surface Structure and Reactivity*

**Brian Quezada** (2010) *Strontium Titanate Surfaces*

**Andres E. Becerra-Toledo** (2011) *Surface Stabilization Mechanisms in Metal Oxides*

**Emilie Ringe** (2012) *Building the Nanoplasmonics Toolbox Through Shape Modeling and Single Particle Optical Studies*

**M'ndange-Pfupfu, Ariel** (2012) *Structural and Chemical Investigations of Nanotribology Using In Situ Transmission Electron Microscopy and Defect Based Analytical Modeling*

**Danielle Kienzle** (2013) *Surface Reconstructions of Oxides*

**Yuyuan Lin** (2014) *Atomic Surface Structures of Oxide Materials: From Single Crystals to Nanoparticles*

**Chuandao Wang** (2014) *Atomically-Precise Synthesis of Platinum Catalysts on Strontium Titanate using Atomic Layer Deposition*

**Emily Hoffman** (2017) *Tribology and Corrosion in CoCrMo Alloys and Similar Systems*

**Betty Peng** (2017) *Shape, Thermodynamics, Kinetics and Growth Mechanisms of Metal and Bimetallic Nanoparticles*

**Pratik Koirala** (2017) *Oxide Surfaces and Flexoelectric Effects*

### **Current PhD Students**

|                  |  |
|------------------|--|
| Crosby, Lawrence | Controlled Heterogeneous Catalysis                     |
| Say Young Cook   | Oxide Surfaces for Electrocatalysis                    |
| Tassie Andersen  | Oxide Surfaces for Electrocatalysis                    |
| Tiffany Ly       | Oxide Nanoparticles and Surfaces                       |
| Chris Mizzi      | Oxide Surfaces and Flexoelectric Effects               |
| Ryan Pauli       | Oxide Nanoparticle Catalysis (with K. R. Poeppelmeier) |
| Zachary Mansley  | Oxide Nanoparticle Catalysis                           |
| Alex Lin         | Tribology and Corrosion                                |

### **Current Postdoctoral Scientist**

Xiao-xiang Yu

Corrosion, Experimental and Theoretical

Edmund Long

Corrosion, Experimental and Theoretical

### **Postdoctoral or Visiting Scientists to date (Chronological)**

D. E. Luzzi, J. P. Zhang, H. Shibahara, J. Singh, H. J. Fan, D. J. Li, H. Zhang, P. Xu, V. A. Volpert, W. Sinkler, C. Leslie, J. J. Hu, F. N. Chukhovskii, R. Kilaas, B. Deng, Y. Wang, S. Eswara Moorth, Y. Liao, H. Amari ), Victor Zenou (Ben-Gurion University of the Negev), Yifeng Liao (Dow Chemical), Ahmet Gulec

### **Recent Collaborators**

M. Asta (UCD), S Barnett (NU), P Blaha (Vienna), O. Bunk (ESRF), M Castell (Oxford), F.-R. Chen (Taiwan), Y. W Chung (NU), J. Ciston (LBNL), U. Diebold (TU-Wien), R. Van Duyne (NU), D. van Dyke (Antwerp), D. Ellis (NU), A. Erdimir (ANL), R. Feidenhans'l (Copenhagen), A. Fischer (Essen), J. Jacobs (Rush), A Kirkland (Oxford), H. Kung (NU), T. Marks (NU), R. Luke (Delaware), M. Olvera (NU), J. Perepezko (Madison), K. Poeppelmeier (NU), P. Reinke (Virginia), E. Ringe (Rice), I. K. Robinson (UCL), J. Rondinelli (NU), J. Scully (Virginia), G. Schatz (NU), S. Shah (NU), K. Shull (NU), W. Sinkler (UOP), P. C. Stair (NU), N. Tanaka (Nagoya), K. Tsuda (Tohoku), P. Voorhees (NU), J. Wang (NU), O. Warschkow (Sydney), O. Warren (Hysitron), W Weitz (NU), M. Yacaman (UTSA), J. Zhegenhagen (ESRF)

### **Talks from 2000- (Invited only)**

#### **2000**

*UHV Electron Microscopy of Surfaces*, 6th International Symposium on Inorganic Materials, Tokyo, Japan (3/2/00)

*Growth of Single-Wall Boron Nitride Nanotubes & Nanostructures*, 5th International Symposium on Advanced Physical Fields, Fabrication & Characterization of Atomic Scale Structures, Tsukuba, Japan (3/6/00 - 3/9/00)

*Direct Methods of Imaging Surfaces*, Workshop on Electron Holography and Other Direct Methods, Hong Kong (8/11/00-8/18/00)

*Transportation Nanotechnology*, Exxon Corporation, Clinton, NJ, December 2000

*Nucleation and Growth of BN Nanostructures*, Aerospace Corporation, Los Angeles, CA December 2000.

*Direct Methods*, LBL, Berkley, CA, December 2000.

#### **2001**

*Feasible-Sets, and the General Phase Problem*, Phase Problem for Non-Periodic Objects, Berkley, CA, May 2001.

*Nucleation and Growth of Quasicrystalline Thin Films*, AFOSR contractors meeting, Florida, July 2001.

*Direct Methods for Surfaces*, Annual Catalysis Center Meeting, Evanston, IL September, 2001.

#### **2002**

*Direct Methods with Electrons*, American Crystallographic Association, San

- Antonio, May 2002  
*In-Situ microscopy*, NTEAM-11 workshop, Berkeley, June 2002  
*Charge Density at Surfaces*, ICSOSS-9, Newcastle, Australia, June 2002  
*Feasible Sets*, International Union of Crystallography, Zurich, July 2002  
*Electron Microscopy of Surfaces*, International Conference on Electron Microscopy, Durban, South Africa, August 2002  
*The Scientist, the Immigrant and the Ombudsman*, keynote lecture, United States Ombudsman Association Annual Meeting, October 2002  
*UHV Micrography of Surfaces*, ICEM Conference, Durban, S. Africa, 9/02
- 2003**  
*Transportation Nanotechnology*, FHWA, Washington, DC, April 2003  
*Direct Methods with Electrons*, Electron Crystallography School, Moscow, June 2003
- 2004**  
*Direct Methods with Electrons*, First NCEM Crystallography School, April 2004,  
*Charge Transfer at Oxide Surfaces*, Electronic Materials Conference, Notre Dame, May 2004  
*Nanotribology and Quasicrystalline Interfaces*, Irsee Conference, May 2004  
*Charge Density at Oxide Surfaces*, Gordon Conference, July 2004  
*Oxide Surfaces*, Gordon Research Conference, July 2004  
*Prospects for Aberration Corrected Precession Diffraction*, TEAM Session, Savannah, Georgia, August 2004  
*Charge Transfer at an MgO Surface*, Microscopy Society of American Annual Meeting, Savannah, Georgia, August 2004  
*Oxides: From Structure to Chemistry*, University of Washington, August 2004
- 2005**  
*Precession Electron Diffraction*, Oxford, UK, January 2005  
*Imaging Surfaces with Electrons*, McMaster, Canada, February 2005  
*Imaging Surfaces with Electrons*, Champaign-Urbana, Midwest Microscopy Meeting, June 2005  
*Precession Electron Diffraction*, ACA Meeting, Orlando, Florida, June 2005  
*Experimental Charge Densities at Surfaces*, IUCR Meeting, Florence, Italy, August 2005  
*Surfaces, Finding the Atoms then Finding the Electrons*, Nancy, France, August 2005  
*Dynamical Direct Methods ; Precession Electron Diffraction*, Brussels, Belgium, September 2005, School on Electron Crystallography
- 2006**  
*Examining Surfaces at the Nanoscale*, Ankara, Turkey, May 2006  
*Electron Diffraction: Synergies*, ELCRYST School on Electron Crystallography, Antwerp, August 2006  
*Charge, Glowing in the Dark*, Chinese Microscopy Meeting, Shengyang, August 2006  
*Charge Glowing in the Dark*, ICEM, Sapporo, Japan, August 2006  
*Precession Electron Diffraction*, Pittsburg Diffraction Conference, October 2006
- 2007**

*What DFT Teaches Surfaces and Surfaces Teach DFT*, Wien2k School, Penn State Univ

*Friction in Full View*, Berkeley Nanomechanics meeting, July 2007

*Charge Density at Surfaces*, EMMM2007, Moscow, September 2007

*Friction in Full View*, Seattle, AVS, October 2007

*Precession Electron Diffraction*, IUCR Crystallography School, Taiwan, November 2007

## **2008**

*Oxide Surfaces*, Korea, February 2008

*Friction in Full View*, Argonne National Labs, May 2008

*Robust Mixing for DFT*, SIAM Conference, Philadelphia, May 2008

*Friction in Full View*, Tribology Gordon Conference, July 2008

*Direct Methods for Surfaces*, ICSOSS, Brazil, August 2008

*Friction in Full View*, Nagoya IUCR Satellite Meeting, September 2008

*Oxide Surfaces*, Lehigh University, September 2008

*Friction in Full View*, Sikkim Discussions, Sikkim, India, November 2008

## **2009**

*Friction in Full View*, Yale University, February 2009

*Friction in Full View*, Heraeus Seminar, Bad Honnef, Germany, March 2009

*Oxide Surfaces*, Spring MRS Meeting, April 2009

*Oxide Surfaces*, APS, Argonne National Labs, April 2009

*Precession Electron Diffraction*, Lille School, France, July 2009

*Oxide Surfaces*, EMC25, Istanbul, Turkey, August 2009

*Friction in Full View*, UTRC, September 2009

*Quantitative Microscopy*, AEM-NANOMAT'09, Saltillo, Mexico, September 2009

*Friction in Full View*, *ibid*

*Oxide Surfaces*, ETH Zurich, October 2009

*Oxide Surfaces*, UIC, November 2009

## **2010**

*Correlated TEM and Optical Surface Plasmon Measurements*, Rio de Janeiro, IMC-7, September 2010

*Correlated TEM and Optical Surface Plasmon Measurements*, Osaka, Japan, October 2010

*Correlated TEM and Optical Surface Plasmon Measurements*, Nagoya, Japan, October 2010

*Oxide Surfaces*, University of Wisconsin, Madison, September 2010

*Tribology in Full View*, McGill University, Canada, October 2010

*Tribology in Full View*, MP3 Workshop, Illinois, October 2010

## **2011**

*The Phase Problem in Electron Crystallography*, Erice School, Sicily, June 2011

*Models for Precession Electron Diffraction*, *ibid*

*Mixing and Minimization*, Wien2k School, Penn State, July 2011

*Correlated TEM and Optical Surface Plasmon Measurements*, EM50, Hyderabad, July 2011

*Solving Structures from Diffraction Data*, MSA, Nashville, August 2011

- Direct Methods for Surfaces*, IUCR Triannual Meeting, Madrid, September 2011
- 2012**
- Tribology in Full View*, Beijing, January 2012  
*Tribology in Full View*, Korea, January 2012  
*Tribology of Carbons*, Gordon Research Conference, June 2012  
*Nanoparticles*: UTSA, 2012  
*Nanoparticles: From Wulff to Winterbottom and Beyond*, MP0903, Brno, March 2012  
*Oxide Surfaces*, Wien Technical University, March 2012  
*Nanoparticles: From Wulff to Winterbottom and Beyond*, TOFA, September 2012  
*Oxide Surfaces*, TMS, Pittsburg, October 2012  
*Nanoparticles: From Wulff to Winterbottom and Beyond*, U. Colorado, November 2012  
*Nanotribology*: NIST, November 2012
- 2013**
- Advanced Electron Microscopy*, UC Irvine, Jan 2013  
*Oxide Surfaces*, ACS, New Orleans, April 2013  
*Tribology in Full View*, 4th International Workshop on Remote Electron Microscopy and In Situ Studies, Portugal, May 2013  
*DFT Mixing*, SIAM Conference, Philadelphia, June 2013  
*Tribology in Full View*, Drexel University, June 2013  
*Hip Implants*, Advances in scanning transmission electron microscopy, Tennessee, August 2013  
*Nanoplasmonics*, EMAG, York, September 2013  
*Solving the Phase Problem*, PICO 2013, October 2013  
*Friction in Full View*, AVS 2013, Long Beach CA, November 2013  
*The Pandora's Box of Perovskite Surfaces*, Argonne National Labs, November 2013  
*Nanoplasmonics & Nanotribology*, Seagate, November 2013  
*Oxides Surfaces and Nanoparticles: from Atomic Surface Structure to Thermodynamically Stable Face Selective Catalysis*, UCLA, November 2013
- 2014**
- Oxide Surfaces*, IMEC16, Haifa, Israel, February 2014  
*Friction in Full View*, CIMTEC 2014, Montecatini Terme, Italy, June 2014  
*Nanoparticle Thermodynamics*, Catalysis Gordon Conference, Colby-Sawyer College, June 2014  
Three Lectures, MSA Preconference School on Diffraction, Hartford, August 2014  
*From Wulff to Winterbottom and Beyond*, IUCR, Montreal, August 2014  
*Oxide Surfaces*, YUCOMAT, Montenegro, October 2014  
*Electron Crystallography*, International Symposium on Crystallography, Fortaleza, Brazil, October 2014  
*Advanced Electron Microscopies*, Duisberg-Essen, Germany, November 2014
- 2015**
- Nanoparticles and Nanoalloys*, ISSC-20, Birmingham, March 2015

- Oxide Surfaces, Opening the Pandora's Box for SrTiO<sub>3</sub>*, MPM-1, Hangzhou, China, May 2015
- Surfaces and Growth In-Situ: From Structure to Designed Nanostructures*, SINANO, Suzhou, China, May 2015
- Electron Crystallography*, Warren Award Lecture, Philadelphia, July 2015
- New Tools for Surfaces*, NIMS, Tsukuba, Japan, July 2015
- New Tools for Surfaces*, UniCat Meeting, Northwestern University, August 2015
- Understanding Nanoparticles*, Rice University, September 2015
- Oxide Surfaces*, MS&T October 2015
- Astor Lectures, October 2015
- Corrosion: rust with 21<sup>st</sup> century tools*
  - Oxide surfaces: opening the Pandora's Box*
  - Nanoparticles: from thermodynamics and shape to plasmonics and catalysis*
- Tribology in Full View*, 2015 STLE Tribology Frontiers Conference
- 2016**
- Tribology in Full View*, Heraeus Conference, March 2016
- Nanoparticles, from Plasmonics to Catalysis*, ASU, April 2016
- Corrosion in 4D*, June 2016
- Oxide Surfaces*, 4th International Workshop on Complex Oxides, June 2016
- Advanced TEM of Surfaces*, ICMAT, Brazil, November 2016
- 2017**
- Unexpected Flexoelectric Effects in Rare Earth Scandates*, Kolkata, Jan 2017
- Rust with 21st Century Tools*, IBTN Keynote Lecture, Feb 2017
- Crystallography of Nanoparticles*, ACA, April 2017
- Pauling's Rules for Oxide Surfaces*, ICSOSS, July 2017
- Chloride in Corrosion*, Yucomat, September 2017
- Carbon, carbon everywhere, from catalysts to hip implants*, AVS, Oct 2017



### **Publications in refereed journals**

1. Multiply-Twinned Particles in Silver Catalysts  
L.D. Marks and A. Howie  
Nature 282(5735): p. 196-198, 1979
2. High-Resolution Studies of Small Particles of Gold and Silver .1. Multiply-Twinned Particles  
L.D. Marks and D.J. Smith  
Journal of Crystal Growth 54(3): p. 425-432, 1981
3. High-Resolution Studies of Small Particles of Gold and Silver .2. Single-Crystals, Lamellar Twins and Polyparticles  
D.J. Smith and L.D. Marks  
Journal of Crystal Growth 54(3): p. 433-438, 1981
4. Direct Lattice Imaging of Small Metal Particles  
D.J. Smith and L.D. Marks  
Philosophical Magazine a-Physics of Condensed Matter Structure Defects and Mechanical Properties 44(3): p. 735-740, 1981
5. New Imaging Methods for Catalyst Particles  
A. Howie, L.D. Marks, and S.J. Pennycook  
Ultramicroscopy 8(1-2): p. 163-174, 1982
6. Observation of the Image Force for Fast Electrons near an MgO Surface  
L.D. Marks  
Solid State Communications 43(10): p. 727-729, 1982
7. Direct Imaging of Carbon-Covered and Clean Gold (110) Surfaces  
L.D. Marks  
Physical Review Letters 51(11): p. 1000-1002, 1983
8. Modified Wulff Constructions for Twinned Particles  
L.D. Marks  
Journal of Crystal Growth 61(3): p. 556-566, 1983
9. HREM and STEM of Defects in Multiply-Twinned Particles  
L.D. Marks and D.J. Smith  
Journal of Microscopy-Oxford 130(MAY): p. 249-261, 1983
10. Direct Surface Imaging in Small Metal Particles  
L.D. Marks and D.J. Smith  
Nature 303(5915): p. 316-317, 1983
11. Elastic Strains and the Energy-Balance for Multiply Twinned Particles

- A. Howie and L.D. Marks  
Philosophical Magazine a-Physics of Condensed Matter Structure Defects and Mechanical Properties 49(1): p. 95-109, 1984
12. Bloch Wave Hrem  
L.D. Marks  
Ultramicroscopy 14(4): p. 351-355, 1984
  13. High-Resolution Surface Imaging  
L.D. Marks  
Acta Crystallographica Section A 40: p. C390-C390, 1984
  14. Direct Atomic Imaging of Solid-Surfaces .1. Image Simulation and Interpretation  
L.D. Marks  
Surface Science 139(1): p. 281-298, 1984
  15. Dispersive Equations for High-Resolution Imaging and Lattice Fringe Artifacts  
L.D. Marks  
Ultramicroscopy 12(3): p. 237-242, 1984
  16. Surface-Structure and Energetics of Multiply Twinned Particles  
L.D. Marks  
Philosophical Magazine a-Physics of Condensed Matter Structure Defects and Mechanical Properties 49(1): p. 81-93, 1984
  17. Direct Observation of Elastic and Plastic-Deformations at Au(111) Surfaces  
L.D. Marks, V. Heine, and D.J. Smith  
Physical Review Letters 52(8): p. 656-658, 1984
  18. Direct Atomic Imaging of Solid-Surfaces .2. Gold (111) Surfaces During and after Insitu Carbon Etching  
L.D. Marks and D.J. Smith  
Surface Science 143(2-3): p. 495-508, 1984
  19. Image Localization  
L.D. Marks  
Ultramicroscopy 18(1-4): p. 33-37, 1985
  20. Imaging Small Particles  
L.D. Marks  
Ultramicroscopy 18(1-4): p. 445-452, 1985
  21. Direct Observation of Diffractive Probe Spreading  
L.D. Marks  
Ultramicroscopy 16(2): p. 261-264, 1985

22. Inhomogeneous Strains in Small Particles  
L.D. Marks  
Surface Science 150(2): p. 302-318, 1985
23. Particle-Size Effects on Wulff Constructions  
L.D. Marks  
Surface Science 150(2): p. 358-366, 1985
24. Electronically Induced Geometrical Catalytic Effects  
L.D. Marks and V. Heine  
Journal of Catalysis 94(2): p. 570-572, 1985
25. Atomic Imaging of Particle Surfaces  
L.D. Marks and D.J. Smith  
Acs Symposium Series 288: p. 341-350, 1985
26. Direct Atomic Imaging of Solid-Surfaces .4. Dislocations on Au(100)  
L.D. Marks and D.J. Smith  
Surface Science 157(1): p. L367-L372, 1985
27. Direct Atomic Imaging of Solid-Surfaces .3. Small Particles and Extended Au Surfaces  
D.J. Smith and L.D. Marks  
Ultramicroscopy 16(1): p. 101-113, 1985
28. The Role of Volume and Pairwise Forces in the Reconstruction of Noble-Metal Surfaces  
V. Heine and L.D. Marks  
Journal of Electron Spectroscopy and Related Phenomena 38(1-4): p. 229-232, 1986
29. Competition between Pairwise and Multi-Atom Forces at Noble- Metal Surfaces  
V. Heine and L.D. Marks  
Surface Science 165(1): p. 65-82, 1986
30. Solid-Like Growth  
L.D. Marks  
Thin Solid Films 136(2): p. 309-315, 1986
31. Quasi-Melting of Small Particles  
L.D. Marks, P.M. Ajayan, and J. Dundurs  
Ultramicroscopy 20(1-2): p. 77-82, 1986
32. Atomic Imaging of Oxygen Desorption from Tungsten Trioxide  
A.K. Petford, L.D. Marks, and M. Okeeffe  
Surface Science 172(2): p. 496-508, 1986

33. Stress Effects in Small Particles  
L.D. Marks, P.M. Ajayan, and J. Dundurs  
Journal of Metals 39(10): p. A85-A85, 1987
34. Order-Disorder in YBa<sub>2</sub>Cu<sub>3</sub>O<sub>7</sub>  
L.D. Marks, J.P. Zhang, S.J. Hwu, and K.R. Poeppelmeier  
Journal of Solid State Chemistry 69(1): p. 189-195, 1987
35. 950-Degrees-C Subsolidus Phase-Diagram for Y<sub>2</sub>O<sub>3</sub>-BaO-CuO System in Air  
G. Wang, S.J. Hwu, S.N. Song, J.B. Ketterson, L.D. Marks, R. Poeppelmeier, and T.O. Mason  
Advanced Ceramic Materials 2(3B): p. 313-326, 1987
36. Quasimelting and Phases of Small Particles  
P.M. Ajayan and L.D. Marks  
Physical Review Letters 60(7): p. 585-587, 1988
37. Contrast Transfer Theory for Non-Linear Imaging  
J.E. Bonevich and L.D. Marks  
Ultramicroscopy 26(3): p. 313-319, 1988
38. Structural Fluctuations in Small Particles  
J. Dundurs, L.D. Marks, and P.M. Ajayan  
Philosophical Magazine a-Physics of Condensed Matter Structure Defects and Mechanical Properties 57(4): p. 605-620, 1988
39. Synthesis and Structure of Copper-Rich and Yttrium-Rich YBa<sub>2</sub>Cu<sub>3</sub>O<sub>7-x</sub> Superconductors  
D.J. Li, H. Shihahara, J.P. Zhang, L.D. Marks, H.O. Marcy, and S. Song  
Physica C 156(2): p. 201-207, 1988
40. Linear Imaging and Diffraction of an Amorphous Film  
L.D. Marks  
Ultramicroscopy 25(1): p. 85-87, 1988
41. High-Resolution Electron-Microscopy of High-Temperature Superconductors  
L.D. Marks, D.J. Li, H. Shihahara, and J.P. Zhang  
Journal of Electron Microscopy Technique 8(3): p. 297-306, 1988
42. Current Flow in Reflection Electron-Microscopy and Rheed  
L.D. Marks and Y. Ma  
Acta Crystallographica Section A 44: p. 392-393, 1988
43. Encapsulation, Diffusion and Diet in the Electron-Microscope  
J. Strane, L.D. Marks, D.E. Luzzi, M.I. Buckett, J.P. Zhang, and B.W. Wessels

- Ultramicroscopy 25(3): p. 253-257, 1988
44. Structure and Polytypes in Thallium Superconductors  
J.P. Zhang, D.J. Li, H. Shibahara, and L.D. Marks  
Superconductor Science & Technology 1(3): p. 132-136, 1988
  45. Experimental-Evidence for Quasimelting in Small Particles  
P.M. Ajayan and L.D. Marks  
Physical Review Letters 63(3): p. 279-282, 1989
  46. Evidence for Sinking of Small Particles into Substrates and Implications for Heterogeneous Catalysis  
P.M. Ajayan and L.D. Marks  
Nature 338(6211): p. 139-141, 1989
  47. Electron-Irradiation Damage in Oxides  
M.I. Buckett, J. Strane, D.E. Luzzi, J.P. Zhang, B.W. Wessels, and L.D. Marks  
Ultramicroscopy 29(1-4): p. 217-227, 1989
  48. Phase-Transitions in V<sub>2</sub>O<sub>5</sub> in a High-Resolution Electron- Microscope  
H.J. Fan and L.D. Marks  
Ultramicroscopy 31(4): p. 357-364, 1989
  49. Trigonal Phases in YBa<sub>2</sub>Cu<sub>3</sub>O<sub>6.5</sub>  
D.J. Li, J.P. Zhang, J.P. Thiel, and L.D. Marks  
Journal of Solid State Chemistry 81(2): p. 165-172, 1989
  50. Ballistic Surface-Diffusion  
Y. Ma and L.D. Marks  
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  51. Bloch-Wave Solution in the Bragg Case  
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