

## Nan Jiang

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**Education:** B.S. in physics, 1988, Jilin University, P. R. China  
M.S. in Physics, 1993, Beijing Laboratory of Electron Microscopy (BLEM), Chinese Science Academy (Professor K. H. Kuo (BLEM) and Professor Y. Q. Sun (Oxford University)), Dissertation: Deformation in intermetallics  $\text{Ni}_3\text{Ga}$   
Ph.D in Materials Science, 1998, The University of Birmingham, UK (Professor I. P. Jones), Dissertation: Determining and Predicting Sublattice Occupancy in Ordered Compounds

### Professional Experience:

1998 – 2000 Postdoctoral Research Associate, Cornell University, USA.  
2000 – Present Associate Research Scientist, Arizona State University.

### Fellowship and Awards

Overseas Research Student (ORS) Award (UK) (1994 – 1998)

### Funding Activity:

PI on Time-resolved EELS of photonic crystals and glasses

Sponsor: NSF DMR

Start date: 07/15/2006

Final expiration date: 06/30/2010

Award amount: \$520,740.00

Co-PI on Ordering/lithography in glasses/alloys

Sponsor: NSF DMR

Start date: 05/01/2003

Final expiration data: 04/30/2006

Award amount: \$332,450.00

Expired

Co-PI on Renewal Proposal for DE-FG52-06NA26213, submitted in Topical Research Area

“Properties of Materials under Extreme Conditions and Hydrodynamics”, sections a and c,

“Enhanced Functionality for Materials Analysis in the DTEM”

Pending

**Postdoctoral Researcher Mentoring:** Dr Dong Su (now at Brookhaven National Laboratory)

### Publications:

#### Publications in journals (\* corresponding author):

2008

1. **Jiang, N.\***, D. Su, and Spence, J. C. H., “Comparison of  $\text{Mg } L_{23}$  edges in  $\text{MgO}$  and  $\text{Mg(OH)}_2$  – importance of medium-range structure”, Ultramicroscopy (2008), in press.
2. D., Su., **Jiang, N.\***, Qiu, J., and Spence, J. C. H., “Microstructures induced by femtosecond laser pulses inside glasses”, J. Mater. Res. (2008), accepted.
3. D. Su, **Jiang, N.\***, Spence, J. C. H., F. He, and W. T. Petuskey, “On the Dehydration Mechanism of  $\text{Mg(OH)}_2$  by a high-energy electron beam”, J. Appl. Phys. 104, 063514 (2008).

4. **Jiang, N.\***, Dong, S., Spence, J. C. H., Zhou, S., and Qiu, J., “*Na L<sub>23</sub>-edge EELS of Na, Na<sub>2</sub>O and Na<sub>2</sub>O-2SiO<sub>2</sub> glass*”, J. Mater. Res. (2008), in press.
5. Zhou, S., **Jiang, N.**, Zhu, B, Chen, J., Yang, H., Hao, J., and Qiu, J.\*, “*Multifunctional Bismuth-doped nanoporous silica glass – From blue-green, orange, red and white light sources to ultra-broadband infrared amplifiers*”, Adv. Func. Mater. 18, 1407 (2008).
6. **Jiang, N.\***, Qiu, J., Humphreys, C. J., and Spence, J. C. H., “*Observation of long-range compositional fluctuations in glasses: implications for atomic and electronic structure*”, Micron 39, 698 (2008).
7. Zhou, S., **Jiang, N.**, Dong, H., Zeng, H., Hao, J., and Qiu, J.\*, “*Size-induced crystal field parameter change and tunable infrared luminescence in Ni<sup>2+</sup>-doped high-gallium nanocrystals embedded glass ceramics*”, Nanotechnology 19, 015702 (2008).

#### 2007

8. **Jiang, N.\***, D. Su, and J. C. H. Spence, “*Determination of Ti coordination from pre-edge peaks in Ti K-edge XANES*”, Phys. Rev. B 76, 214117 (2007).
9. Su, D.\*, **Jiang, N.**, Wen, J., and Liu, J., “*Oxygen bonding in bismuth layered compounds SrBi<sub>2</sub>Ta<sub>2</sub>O<sub>9</sub>*”, Materials and Processes for Nonvolatile Memories II, Mater. Res. Soc. Symposium Proceedings Vol.997, I06-04 (2007).
10. **Jiang, N.\***, D. Su, and J. C. H. Spence, “*Sodium reorganization on surface of silicate glasses in TEM*”, Appl. Phys. Lett. 91, 231906 (2007).
11. Wu, B., Qiu, J.\*, **Jiang, N.**, Zhou, S., et al., “*Transparent glass-ceramics embedded Ni<sup>2+</sup>-doped  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> nanocrystal with broadband infrared luminescence*” J. Mater. Res. 22, 3410 (2007).
12. **Jiang, N.\*** and Spence, J. C. H., “*Electron energy-loss spectroscopy in irradiation-sensitive rutile GeO<sub>2</sub>*”, J. Non-Cryst. Solids 353, 2813 (2007).
13. **Jiang, N.\***, Wu, B., J. Qiu, and J. C. H. Spence, “*Precipitation of nano crystals in glasses by electron irradiation: an alternative path to form glass-ceramics?*”, Appl. Phys. Lett. 90, 161909 (2007).
14. Zhou, S., Feng, G., Wu, B., **Jiang, N.**, Xu, S., and Qiu, J.\*, “*Intense Infrared Luminescence in transparent glass-ceramics containing  $\beta$ -Ga<sub>2</sub>O<sub>3</sub>:Ni<sup>2+</sup> Nanocrystals*”, J. Phys. Chem. C 111, 7335 (2007).
15. Zhu, B., Zhang, S., Zhou, S., **Jiang, N.**, Qiu, J.\*, “*Enhanced up conversion luminescence of transparent Eu<sup>3+</sup>-doped glass-ceramics containing nonlinear optical microcrystals*”, Optics Letter 32, 653 (2007).

#### 2006

16. **Jiang, N.\***, “*Structure and composition dependence of oxygen K edge in CaAl<sub>2</sub>O<sub>4</sub>*”, J. Appl. Phys. 100, 013703 (2006).
17. **Jiang, N.\*** and Spence, J. C. H., “*Can near-edge structure of Bi L<sub>3</sub> edge determine the formal valence states of Bi?*”, J. Phys.: Condens. Matter 18, 8029 (2006).
18. **Jiang, N.\*** and Spence, J. C. H. “*Interpretation of O K pre-edge peak in complex oxides*”, Ultramicroscopy 106, 215 (2006).
19. **Jiang, N.\***, Jiang, B., Erni, R., N. D. Browning, and Spence, J. C. H., “*Experimental and theoretical improvements on understanding of the O K edge of TeO<sub>2</sub>*”, Ultramicroscopy 106, 123 (2006).

#### 2005

20. **Jiang, N.\***, Qiu, J. and Spence, J. C. H., “*Precipitation of Ge nano-particles from GeO<sub>2</sub> glasses in transmission electron microscope*”, Appl. Phys. Lett. 86, 143112 (2005).
21. **Jiang, N.\*** and Spence, J. C. H., “*Comment on ‘Extended electron energy loss fine structure simulation of the local boron environment in sodium aluminosilicate glasses containing gadolinium’*”, J. Non-Cryst. Solids 351, 184 (2005).

#### 2004

22. **Jiang, N.\*** and Spence, J. C. H., “*Electron energy-loss spectroscopy of O K-edge of NbO<sub>2</sub>, MoO<sub>2</sub>, and WO<sub>2</sub>*”, Phys. Rev. B 70, 245117 (2004).

23. **Jiang, N.\*** and Spence, J. C. H., “On intermediate-range structure of tellurite glasses from near-edge absorption spectrum”, *Phys. Rev. B* 70, 184113 (2004).
24. **Jiang, N.\***, Qiu, J., and Silcox, J., “Effects of high-energy electron irradiation on heavy-metal fluoride glass”, *J. Appl. Phys.* 96, 6230 (2004).
25. **Jiang, N.\*** and Spence, J. C. H., “Modeling core-hole effects in electron energy-loss spectroscopy of  $\text{TeO}_2$ ”, *Phys. Rev. B* 70, 014112 (2004).
26. **Jiang, N.\*** and Silcox, J., “High-energy electron irradiation and B coordination in  $\text{Na}_2\text{O-B}_2\text{O}_3\text{-SiO}_2$  glass”, *J. Non-Cryst. Solids* 342, 12 (2004).
27. J. Wu, **N. Jiang**, B. Jiang, J. C. H. Spence\*, A. V. Pogrebnnyakov, J. M. Redwing, and X. X. Xi, “Interface structures in  $\text{MgB}_2$  thin films on (0001) SiC”, *Appl. Phys. Lett.* 85, 1155 (2004).
28. Qiu, J.\*, Jiang, X., Zhu, C., Shirai, M., Si, J., **Jiang, N.**, and Hirao, K., “Manipulation of Gold Nanoparticles inside Transparent Materials”, *Angew Chem. Int. Ed.* 43, 2230, (2004).
29. **Jiang, N.\*** and Spence, J. C. H., “Core-hole effects on electron energy-loss spectroscopy of  $\text{Li}_2\text{O}$ ”, *Phys. Rev. B.* 69, 115112 (2004).

#### 2003

30. **Jiang, N.\***, “Can we trust TEM images of silicate glasses?”, *Radiation Effects and Ion-Beam Processing of Materials Symposium, Mater. Res. Soc. Symposium Proceedings Vol.792*, pp. 223-7 (2003).
31. **Jiang, N.\***, Hembree, Spence, J. C. H., Qiu, J., de Abajo, F. J. G., and Silcox, J., “Nanoring formation by direct-write inorganic electron-beam lithography”, *Appl. Phys. Lett.* 83, 551 (2003).
32. **Jiang, N.\***, Qiu, J., Ellison, A. and Silcox, J., “Fundamentals of High-Energy Electron-Irradiation-Induced Modifications in Silicate Glasses”, *Phys. Rev. B* 68, 064207 (2003).
33. Jiang, B.\*, Zuo, J. M., **Jiang, N.**, O’keeffe, M. and Spence, J. C. H., “Charge density and chemical bonding in rutile,  $\text{TiO}_2$ ”, *Acta Cryst.* A59, 341 (2003).
34. **Jiang, N.\***, Jiang, B., Spence, J. C. H., Lee, S., and Tajima, S., “Dislocations in  $\text{MgB}_2$ ”, *Phil. Mag. Lett.* 83, 495 (2003).
35. **Jiang, N.\***, Denlinger, and Spence, J. C. H., “Electronic structure and oxygen bonding in  $\text{CaSiO}_3$  silicate”, *J. Phys.: Condens. Matter* 15, 5523 (2003).
36. Jiang, B.\*, **Jiang, N.**, and Spence, J. C. H., “Core-hole effects on the B Kedge in  $\text{MgB}_2$ ”, *J. Phys.: Condens. Matter* 15, 1299 (2003).

#### 2002

37. **Jiang, N.\***, J. Qiu and J.C. H. Spence, “Long-rang structural fluctuations in a  $\text{CaO-Al}_2\text{O}_3\text{-SiO}_2$  glass observed by spatially resolved near-edge spectroscopy”, *Phys. Rev. B* 66, 054203 (2002).
38. **Jiang, N.\***, Jiang, B., and Spence, J. C. H., “Anisotropic excitons in  $\text{MgB}_2$  from orientation-dependent electron-energy-loss spectroscopy”, *Phys. Rev. B* 66, 172502 (2002).
39. **Jiang, N.\***, T. J. Eustis, J. Cai, F. A. Ponce, J. C. H. Spence and J. Silcox, “Polarity determination by atomic location by channeling-enhanced microanalysis”, *Appl. Phys. Lett.* 80, 389, (2002).
40. **Jiang, N.\*** and J. Silcox, “Electron irradiation induced phase decomposition in alkaline earth multi-component oxide glass”, *J. Appl. Phys.* 92, 2310, (2002).
41. **Jiang, N.\***, “On detection of non-bridging oxygen in glasses by electron energy-loss spectroscopy”, *Solid State Communications* 122, 7 (2002).
42. **Jiang, N.\***, J. Qiu, A.Garta,J. Silcox, “Nanoscale modification of optical properties in  $\text{Ge/SiO}_2$  glass by electron irradiation”, *Appl. Phys. Lett.* 80, 2005 (2002).
43. J. C. H. Spence\*, **Jiang, N.**, U. Weierstall, “Ordering energies and occupancies in doped  $\text{TiAl}$ , dedicated ALCHEMI instrumentation”, *Micro. Microanal.* 8, 241 (2002).

#### Prior to ASU

44. **Jiang, N.\***, J. Qiu, J. Silcox, “Precipitation of nm scale Zn particles in  $\text{ZnO-B}_2\text{O}_3\text{-SiO}_2$  glass during electron irradiation”, *Appl. Phys. Lett.* 77, 3956 (2000).
45. **Jiang, N.\*** and Silcox, J., “Observations of reaction zones at Chromium/ oxide glass interfaces”, *J. Appl. Phys.* 87, 3768 (2000).

46. T. S. Rong\*, **N. Jiang**, M. Aindow, and I. P. Jones, "ALCHEMI studies of B2 Nb-Al-V alloys", EMAG99, Inst. Phys. Conf. Ser. No. 161, 439 (1999).
47. **Jiang, N.\***, "Predicting sublattice occupancy in ternary intermetallic compounds: an analytical approach", Phil. Mag. A **79**, 2953 (1999).
48. **Jiang, N.\***, Hou, D.H., Jones, I.P. and Fraser, H.L., "Optimizing the ALCHEMI technique", Phil Mag. A **79**, 2525 (1999).
49. **Jiang, N.\***, Rong, T., Jones, I.P. and Aindow, M., "On the effect of antiphase domain boundaries on ALCHEMI", Phys. Stat. Sol. (b) **214**, 237 (1999).
50. Zhang, J.\* and **Jiang, N.**, et al., "Heteroepitaxial growth of a c-axis-oriented BaTiO<sub>3</sub>/YBa<sub>2</sub>Cu<sub>3</sub>O<sub>7</sub> bilayer structure by pulsed-laser ablation", Appl. Phys. Lett. **66**, 2069 (1995).
51. **Jiang, N.** and Sun, Y. Q.\*, "Antiphase-domain-boundary tubes in Ni<sub>3</sub>Ga involving secondary slip", Phil. Mag. Letters **68**, 107 (1993).
52. **Jiang, N.\*** and Sun, Y. Q., "The crystallography and observation of anti-phase domain boundary tubes in superlattices", Acta Cryst. **49A**, suppl., 368 (1993).

#### Manuscripts accepted and in process

1. **Jiang, N.\*** and Spence, J. C. H., "L<sub>1</sub> edge ELNES of Si and Al in SiO<sub>2</sub> and Al<sub>2</sub>O<sub>3</sub>", Ultramicroscopy (2007). *Accepted but requiring extra data.*

#### Submitted manuscripts (under review)

1. **Jiang, N.\***, Su, D., Spence, J. C. H., Zhou, S., and Qiu, J., "Volume plasmon of bismuth nanoparticles embedded in SiO<sub>2</sub> matrix", submitted to Appl. Phys. Lett. (2008).
2. **Jiang, N.\***, Su, D., and Spence, J. C. H., "On the thickness measurement by EELS", submitted to Ultramicroscopy (2008).
3. Zhou, S., Jiang, N., Wu, B., Hao, J., and Qiu, J.\*, "Ligand-drive wavelength tunable and ultra-broadband infrared luminescence in single ion doped transparent hybrid materials", submitted to Advanced Functional Materials, (2008).
4. **Jiang, N.\***, D. Su, and Spence, J. C. H., "Electronic density of states and absorption fine structures in Rutile RuO<sub>2</sub>", submitted to J. Phys: Condens. Matter. (2008).
5. **Jiang, N.\***, D. Su, and Spence, J. C. H., "Core-hole effect on O K-edge XANES of Sr<sub>2</sub>RuO<sub>4</sub>", submitted to Phys. Rev. B (2008).
6. Su, D.\*, Yamada, T., Gysel, R., Tagantsev, A. K., Muralt, P., Setter, N., and **Jiang, N.**, "Defects and growth of epitaxial SrTiO<sub>3</sub> thin films on LaAlO<sub>3</sub> substrate by two-step growth technique", submitted to J. Appl. Phys. (2008).
7. **Jiang, N.\*** and Spence, J. C. H., "Electron energy-loss spectroscopy of hydroxyl (OH) compound Al(OH)<sub>3</sub>", submitted to Ultramicroscopy (2007) (under revision).
8. **Jiang, N.\***, Wu, B., and Qiu, J., "Ni coordination in alkali gallium silicate glass-ceramics by electron energy loss spectroscopy", submitted to Appl. Phys. Lett. (2007) (under revision)
9. **Jiang, N.\***, and Spence, J. C. H., "Time-resolved electron energy-loss spectroscopy (TREEELS) of spinel MgAl<sub>2</sub>O<sub>4</sub>", submitted to J. Appl. Phys. (2007) (under revision).

#### Book

Nan Jiang, "Electron channeling effects and ALCHEMI", in Progress in Transmission Electron Microscopy (in Chinese), (Science Press, P. R. China, 2004, ISBN 7-03-011895-2), pp. 149 - 73.

#### Invited Talks

1. 59<sup>th</sup> Annular Meeting of the Microscopy Society and 35<sup>th</sup> Annular Meeting of the Microbeam Analysis Society, Long Beach, CA, August 5-9, 2001. Title: *How accurate is ALCHEMI for ordering measurements?*
2. Microscopy and Microanalysis 2004, August 1-5, 2004, Savannah, Georgia. Title: *Spatially resolved EELS – an alternative approach for characterizing glass structure*

3. 7<sup>th</sup> Pacific Rim Conference on Ceramic and Glass Technology, 2007, Shanghai, China. Title: *TEM in electron beam sensitive materials*

### **Presentations**

1. Nan Jiang and J. Silcox, “meta/glass interface by high spatial resolution EELS”, Microscopy and Microanalysis 1999, Portland, OR.
2. Nan Jiang and J. Silcox, MRS fall meeting, 1999, Boston, MA.
3. Nan Jiang and J. Silcox, Microscopy and Microanalysis 2000, Philadelphia, PA.
4. Nan Jiang, “Electron lithography in glasses”, Microscopy and Microanalysis 2003, San Antonio, Texas;
5. Nan Jiang, “In situ study of e-beam modifications in glasses”, MRS fall meeting, 2003, Boston, MA;
6. Nan Jiang, “Chemical bonding in  $\text{CaSiO}_3$ ”, The Gorgon Research Conferences on Electron Distribution and Chemical Bonding, July 4 – 9, 2004, Mount Holyoke College, South Hadley, MA.
7. Nan Jiang, “Time-resolved EELS in  $\text{MgAl}_2\text{O}_4$  and  $\text{CaAl}_2\text{O}_4$ ”, Microscopy and Microanalysis 2005, Honolulu, Hawaii;
8. Nan Jiang, “Atom migration in  $\text{MgAl}_2\text{O}_4$  – by electron pump-probe at RT”, MRS fall meeting, 2005, Boston, MA;
9. Nan Jiang, “Nanoparticles and TEM”, MRS Spring meeting, San Francisco, CA;
10. Nan Jiang, “EESL in e-beam-sensitive materials”, Microscopy and Microanalysis 2006, Chicago, Illinois;
11. Nan Jiang, “Na in silicate glasses under electron beam”, Microscopy and Microanalysis 2007, Ft. Lauderdale, Florida;
12. Nan Jiang, “Transmission electron microscopy and transparent glass ceramics”, MRS spring meeting, 2007, San Francisco, CA.
13. Nan Jiang, “Are Si (or Al)  $L_1$  and K ELNES different in  $\text{SiO}_2$  (or  $\text{Al}_2\text{O}_3$ )?”, Cornell Workshop on Electron Microscopy: Fundamental Limits and New Science, 2006, Ithaca, NY.
14. Nan Jiang, “EELS+TEM in glasses and glass-ceramics”, ACerS 2008 Glass & Optical Materials Division Meeting, Tucson, AZ.

### **Synergistic Activities:**

- ❖ Conducted research in an interdisciplinary research group (IRG) (Glasses: bulk, interface and surface) in Cornell (1998 – 2000), collaborating with Faculty members include Profs N. W. Ashcroft, D. G. Ast, S. P. Baker, J. M. Blakely, R. Dieckmann, C. Umbach, J. Silcox, J. R. Engstrom, and F. Fehlner (Corning Inc.).
- ❖ Collaborating with faculties, scientists and students outside ASU:
  - Photon Craft Project, Japan Science and Technology Corporation;
  - Zhejiang University of China on glasses and glass-ceramics for optical applications (2000 – current);
  - Lawrence Berkeley National Laboratory, Advanced Light Source (J. D. Denlinger);
  - Lawrence Berkeley National Laboratory, NCEM (R. Erni and N. D. Browning);
  - Cornell University (J. Silcox)
  - UIUC (J. Zuo)
  - University of Cambridge (Prof. C. J. Humphreys);
  - Cavendish laboratory (Prof. A. Howie)
  - Ohio State University (Prof. H. L. Fraser);
  - Donostia International Physics Center, San Sebastian, Spain (F. J. Garcia de Abajo).
- ❖ Collaborating with faculties and scientists within ASU:
  - Dr. G. G. Hembree (Physics)
  - Dr. U. Weierstall (Physics)

Prof. F. A. Ponce (Physics)

Prof. W. T. Petuskey (Chemistry and Biochemistry)

Prof. M. O’Keeffe (Chemistry and Biochemistry)

- ❖ Software development to predict sublattice occupation and electron channeling effects in intermetallics. The software is being used by the University of Birmingham (UK) and ASU personnel.
- ❖ Instructor: Winter School on High Resolution Electron Microscopy

## **Service**

### *University and Department Service*

1. Department of Physics Academic Professional peer review Committee;
2. Department of Physics Academic Professional Promotion Committee;
3. Coordinator: Nanoscience and Nanotechnology Seminar Series for 2008-2009;
4. Instructor: Winter School on High Resolution Electron Microscopy;
5. Instructor and maintainer: Fuji image plate reader.

### *Professional Service outside of ASU*

1. refereeing grant proposals for NSF;
2. refereeing scientific papers in international journals (Phys. Rev Lett, Phys. Rev. B, Appl. Phys. Lett., J. Appl. Phys., Phil. Mag., Acta Mater., J. Mater. Res., J. Electron Spectroscopy, Micron, Chem Geo., and Microscopy and Microanalysis);
3. Session Chair: 7<sup>th</sup> Pacific Rim Conference on Ceramic and Glass Technology, 2007, Shanghai, China

### *Professional Affiliations:*

Member of Materials Research Society, the American Ceramic Society

## **Patents and Disclosures**