YING SHIRLEY MENG, PH.D.

Assistant Professor

Nano Engineering
Room 2703 Atkinson Hall (Calit2)
858-822-7936 (phone)
shirleymeng@ucsd.edu (email)

University of California San Diego
La Jolla, California 92093-0448
Fax 858-534-9553 (fax)
web: http://smeng.ucsd.edu/

a. Education and Training

Nanyang Technological University, Singapore	B.A.Sc (Matl. Eng.)	1996 – 2000
Singapore-MIT Alliance, National University of Singapore	Ph.D.	2000 – 2005
Massachusetts Institute of Technology	Postdoc	2005 – 2007

b. Research and Professional Experience

2009 – present Assistant Professor, Nano Engineering, University of California, San Diego
2008 – 2009 Assistant Professor, Materials Science and Engineering, University of Florida
2007 – 2008 Research Scientist, Materials Science and Engineering, Massachusetts Institute of Technology

Meng's research group (**LESC: Laboratory for Energy Storage & Conversion**) focuses on the field of energy storage and conversion materials: nano structured electrodes for advanced lithium batteries and thermoelectric materials; charge ordering, structure stability, processing – structure – property relation in functional ceramics and combining *ab initio* computation with selected experiments for rational materials design for energy applications.

c. Relevant Publications

1. M. Jiang, B. Keya, Y. S. Meng, C. P. Grey, "Electrochemical and Structural Study of the "Li-excess" Electrode Material $Li[Li_{1/9}Ni_{1/3}Mn_{5/9}]O_2$", **Chemistry of Materials**, 21, 2733, 2009.
2. Y. S. Meng and E. Arroyo-de Dompablo, *"First Principles Computational Materials Design for Energy Storage Materials in Lithium Ion Batteries"*, **Energy & Environmental Science**, 2, 589, 2009. (**Invited Review - Top-10 Most Downloaded Article)**
3. J. L. Jones, J-T. Hung and Y. S. Meng, "*Intermittent X-ray Diffraction Study of Kinetics of Delithiation in $LiFePO_4$*", **Journal of Power Sources**, 189, 702, 2009.
4. R. E. Doe, K. A. Persson, Y. S. Meng and G. Ceder, *"First-Principles Investigation of the Li-Fe-F Phase Diagram and Equilibrium and Non-equilibrium Conversion Reactions of Iron Fluorides with Lithium"*, **Chemistry of Materials**, 20, 5274, 2008.
5. C. Wang, Y.S. Meng, G. Ceder and Y. Li, *"Electrochemical Properties of Nano-structured $Al_{1-x}Cu_x$ Alloy as Anode Materials for Rechargeable Lithium Ion Batteries"*, **Journal of the Electrochemical Society**, 155 (9), 2008.
6. Y. Hinuma, Y.S. Meng and G. Ceder, "*Temperature-Concentration Phase Diagram of P2-Na_xCoO_2 by First Principles Calculations*", **Physical Review B**, 77, 224111, 2008.
7. J. Li, W. Yao, Y.S. Meng and Y. Yang, "*Effects of Vinyl Ethylene Carbonate (VEC) Additive on Elevated-Temperature Performance of Cathode Material in Lithium ion Batteries*", **Journal of Physical Chemistry C**, 112, 12550, 2008.
8. W. W. Pai, S. H. Huang, Y. S. Meng, Y. C. Chao, C. H. Lin, H. L. Liu, F.C. Chou, "Sodium Trimer Ordering on Na_xCoO_2 Surface", **Physical Review Letters**, 100 206404, 2008.
9. Y.S. Meng, Y. Hinuma and G. Ceder, *"An Investigation of Sodium Patterning in Na_xCoO_2 ($0.5 \le x \le 1$) by DFT Methods"*, **Journal of Chemical Physics**, 128, 104708, 2008.
10. H. Xia, L. Lu and Y.S. Meng, "*Growth of layered $LiNi_{0.5}Mn_{0.5}O_2$ Thin Films by Pulsed Laser Deposition for Application in Microbatteries*", **Applied Physics Letters**, 92, 011912, 2008.
11. K. Tibbetts, C. Miranda, Y. S. Meng and G. Ceder, *"An Ab Initio study of lithium diffusion in titanium disulfide nanotubes"*, **Chemistry of Materials**, 19 (22), 5302, 2007.
12. X. Ma, K. Kang, G. Ceder and Y.S. Meng, *"Synthesis and Electrochemical Properties of Layered $LiNi_{2/3}Sb_{1/3}O_2$"*, **Journal of Power Sources**, 173(1), 550, 2007.

13. L. Wang, F. Zhou, Y.S. Meng and G. Ceder, *"A first-principles study of surface properties of $LiFePO_4$: surface energy, equilibrium morphology and surface redox potential"*, **Physical Review B**, 76, 165435, 2007.
14. H. Xia, Y.S. Meng, L. Lu and G. Ceder, *"Nonstoichiometric $LiNi_{0.5}Mn_{1.5}O_{4-\delta}$ thin film electrodes prepared by pulsed laser deposition"*, **Journal of the Electrochemical Society**, 154(8), A737, 2007.
15. H.H. Li, N. Yabuuchi, Y.S. Meng, G. Ceder, J. Breger, C.P. Grey and Y. Shao-Horn, *"Changes in the Cation Ordering of Layered O3 $Li_xNi_{0.5}Mn_{0.5}O_2$ During Electrochemical Cycling to High Voltages: An Electron Diffraction Study"*, **Chemistry of Materials**, 19, 2551, 2007.
16. Y. Hinuma, Y.S. Meng, K. Kang and G. Ceder, *"Phase transition in the $LiNi_{0.5}Mn_{0.5}O_2$ system upon temperature change"*, **Chemistry of Materials**, 19 (7), 1790, 2007.
17. H. Xia, L. Lu, Y.S. Meng and G. Ceder, "*Phase transitions and high-voltage electrochemical behavior of $LiCoO_2$ thin films grown by PLD*"**, Journal of the Electrochemical Society**, 154 (4), A337, 2007.
18. H. Xia, S. B. Tang, L. Lu, Y.S. Meng and G. Ceder, *"The influence of preparation conditions on electrochemical properties of $LiNi_{0.5}Mn_{1.5}O_4$ thin film electrodes by PLD"*, **Electrochimica Acta** 52, 1120, 2006.
19. J. Breger, Y.S. Meng, Y. Hinuma, S. Kumar, Y. Shao-Horn, G. Ceder and C.P. Grey, "*The effect of high voltages on the structure and electrochemistry of $LiNi_{0.5}Mn_{0.5}O_2$: a joint experimental and theoretical study*", **Chemistry of Materials**, 18, 4768, 2006.
20. K. Kang, Y.S. Meng, J. Breger, C.P. Grey and G. Ceder, *"Electrodes with high power and high capacity for rechargeable lithium batteries"*, **Science,** 311, 977, 2006.
21. Y.S. Meng, A. Van der Ven, M.C.K. Chan and G. Ceder, *"Ab-initio study of sodium ordering in $Na_{0.75}CoO_2$ and its relation to Co^{3+}/Co^{4+} charge ordering"*, **Physical Review B,** 72, 172103, 2005.
22. A. Van der Ven, D. Morgan, Y.S. Meng and G. Ceder, *"Phase stability of nickel hydroxides and oxyhydroxides"*, **Journal of the Electrochemical Society,** 153 (2) A210, 2005.
23. J. Breger, M. Jiang, N. Dupré, Y.S. Meng, Y. Shao-Horn, G. Ceder, C.P. Grey, *"High resolution X-ray diffraction, DIFFaX, NMR and first principles study of disorder in the $Li_2MnO_3 - Li(NiMn)_{1/2}O_2$ solid solution"*, **Journal of Solid State Chemistry**, 178, 2575-2585, 2005.
24. Y.S. Meng, G. Ceder, C.P. Grey, W.-S. Yoon, M. Jiang, J. Greger and Y. Shao-Horn, *"Cation ordering in layered O3 $Li[Ni_xLi_{1/3-2x/3}Mn_{2/3-x/3}]O_2$ ($0 \le x \le 1/2$) compounds"*, **Chemistry of Materials**, 17 (9), 2386, 2005.
25. Y.S. Meng, G. Ceder, C.P. Grey, W.-S. Yoon, and Y. Shao-Horn, *"Understanding the crystal structure of layered $LiNi_{0.5}Mn_{0.5}O_2$ by electron diffraction and powder diffraction simulation"*, **Electrochemical and Solid-State Letters 7**(6) A155, 2004.
26. Y.S. Meng, Y.W. Wu, B.J. Hwang, Y. Li and G. Ceder, *"Combining ab-initio computation with experiments for designing new electrode materials for advanced lithium batteries: $LiNi_{1/3}Fe_{1/6}Co_{1/6}Mn_{1/3}O_2$"*, **Journal of the Electrochemical Society,** 151(8) A1134, 2004.

d. Patents

1. Y. S. Meng, "High Energy Density Cathode Materials for Lithium Ion Batteries," US 61/162766, pending, 2009.
2. Y. S. Meng, F. So, J. Xue, J. Reynolds, K. R. Zawoy, "Integrated PV/Battery/OLED Lighting Module (SoLiOled)," US/183359, pending, 2009.

e. Invited Talks

1. Materials Science & Technology 2009 Conference, Pittsburgh, Oct. 27, 2009.
2. State Key Lab for Physical Chemistry of Solid Surfaces, Xiamen University, China, June 25, 2009.
3. Department of Physics, Chinese University of Hong Kong, June 22, 2009.
4. Oak Ridge National Laboratory, USA, May 28, 2009.
5. CERMACS Annual Meeting, American Chemical Society, Cleveland, Ohio, May 22, 2009.
6. Florida Institute of Sustainable Energy (FISE) Seminar, March 16, 2009.
7. Department of Nano Enginerring, University of California San Diego, December 8, 2008.
8. Materials Science and Technology 2008 Conference, Pittsburg, Pennsylvania, October 6, 2008.
9. Department of Materials Scinece and Engineering, University of Michigan, September 26, 2008.

10. International Materials Research Congress (IMRC), Annual Conference, Cancun, Mexico, August 18-21, 2008.
11. Korea Electrotechnology Research Institute (KERI), Pusang, Korea, July 7, 2008.
12. National Taiwan University of Science and Technology, Taipei, Taiwan, June 20, 2008.
13. International Meeting for Lithium Batteries (IMLB) 2008, Tianjin, China, June 22-27, 2008.
14. International Materials Research Congress (IMRC), Annual Conference, Cancun, Mexico, October 28-30, 2007.
15. University of Bordeaux, ICMCB, France, September 27, 2007.
16. CSIRO Energy Technology, Commonwealth Scientific and Industrial Research Organization (CSIRO), Melbourne, Australia, July 24-25, 2007.
17. Department of Physics, University of California Davis, April 9 – 10, 2007.
18. Nanoscience and Nanoengineering Institute and Department of Materials Science and Engineering, University of California Berkeley, January 25, 2007.
19. Department of Materials Science and Engineering, University of Florida, January 18, 2007.
20. Department of Physics, Chinese University of Hong Kong, September 1, 2006.
21. State Key Lab for Physical Chemistry of Solid Surfaces, Xiamen University, China, Aug 31, 2006.
22. The 7th China International Battery Fair, Beijing, China June 28-30, 2006.
23. Lawrence Livermore National Laboratory, USA, June 9, 2006.
24. Department of Materials Science and Engineering, Stanford University, Palo Alto, June 5, 2006.
25. Industrial Technology Research Institute ITRI, Taiwan, May 19, 2006.
26. International Battery Association – Hawaii Battery Conference (IBA-HBC), Hawaii, USA, Jan 9-13, 2006.
27. Department of Mechanical Engineering, University of Texas, Austin, May 5, 2005.

f. Synergistic Activities

Regular reviewer for Chemistry of Materials, Journal of Power Sources, Journal of the Electrochemical Society, Electrochemical and Solid-State Letters, Solid State Ionics, and Journal of Physical Chemistry.
Panel reviewer for National Science Foundation, USA
Organizer - International Lecture Series on Materials Design and Development for Energy Storage and Conversion, Taipei May15-18, 2006
Co-Organizer - Functional Ceramics for Energy Storage & Conversion (Symposium 5) for the Electronic Materials and Applications (EMA) 2010 Conference, Orlando January 20-22, 2010.
Instructor Short Course on Lithium Battery Materials, the 212th Electrochemical Society Meeting, Washington DC Oct. 7-12, 2007 and the 216th ECS Meeting, Vienna, Oct.4-9, 2009.
Faculty Advisor – Society for Green Mobility, University of Florida, 2008-2009

g. Professional Memberships:

Electrochemical Society; Materials Research Society; American Physics Society, American Ceramic Society, American Chemical Society

h. Awards and Honors

2008, Early Career Faculty Travel Award (The Electrochemical Society);
2003, Graduate Student Award (Materials Research Society)
2002, Systems on Silicon Manufacturing Co. Pte. Ltd (SSMC) Award
2000, Singapore-MIT Alliance Postgraduate Study Scholarship (2000-2005)
1998, Industrial Attachment Book Prize
1996, Singapore Welding Society Book Prize
1995, Ministry of Education Singapore Undergraduate Study Scholarship (1996-2000)
1994, Wong's Fund (USA) Award