Gary K. Ong

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REFERENCES

Professor Delia J. Milliron, UT Austin, milliron@che.utexas.edu
Professor Fiona M. Doyle, UC Berkeley, fmdoyle@berkeley.edu
Professor Mark Asta, UC Berkeley, mdasta@berkeley.edu

EDUCATION

THE UNIVERSITY OF CALIFORNIA **COLLEGE OF ENGINEERING** Berkeley, CA

Doctor of Philosophy *Materials Science and Engineering* *May 2018*

Thesis Title: Assembly of and Ion Transport through Porous Nanocrystal Structures
Advisors: Professor Delia J. Milliron and Professor Fiona M. Doyle
Awards and honors: National Science Foundation Fellowship, Berkeley Chancellor's Fellowship

Bachelors of Science *Materials Science and Engineering* *May 2012*

Awards and honors: Highest honors, departmental citation, Joseph Park Memorial Award, Semiconductor Research Corporation Fellowship

RESEARCH EXPERIENCE

CHEMICAL ENGINEERING – UNIVERISTY OF TEXAS AT AUSTIN Austin, TX

Graduate Student Researcher and Visiting Scholar Aug. 2014 – Present

- Developing proton transport materials to enable intermediate temperature operation of proton exchange membrane fuel cells.
    - Built a variable temperature and gaseous environment stage with automated AC/DC data collection using LabVIEW for ion transport.
    - Developed the synthesis for cerium oxide, gadolinium and gallium doped cerium oxide.
- Developed niobium oxide electrochromics that demonstrate new near-infrared electrochromic functionality with up to a 10x improvement in switching speed.
- Initiated work and currently hold an advisory role for projects associated with nanocrystal gels.
- Initiated work and currently hold an advisory role for projects associated with nanocrystal surface chemistry.
- Coauthored accepted proposals for funding from the National Science Foundation for a new small angle x-ray scattering instrument and materials research center at UT, to the Department of Energy, and national laboratories (beam-time request and facility access).
- Set up the new lab at UT Austin for the Milliron group (chemistry wet lab and general characterization lab).
- Built the chemical inventory system now implemented campus wide in UT Austin.

THE MOLECULAR FOUNDRY – BERKELEY NATIONAL LABORATORY Berkeley, CA

Graduate Student Researcher Sept. 2012 – July 2014

- Developed and studied block copolymer assembly of nanocrystals
    - Preformed micelle assemblies of nanocrystals for templating porous thin film structures
    - Solvent annealed microphase separated assembly of nanocrystals in thin films for well ordered directed nanocrystal assemblies.

INTEL CORPORATION – RONLER ACRES CAMPUS Hillsboro, OR

Failure Analysis Intern May 2014 – Aug. 2014

- Conducted failure analysis on back and far back end wafer layers specifically for metal line failure modes such as void and intermetallic formation, delamination, crystallographic texture effects on electromigration, and corrosion.

ELECTRICAL ENGINEERING - UNIVERSITY OF CALIFORNIA Berkeley, CA

Undergraduate Research Assistant Sept. 2010 – Dec. 2011

- Conducted current-voltage and capacitance-voltage measurements on oxide materials and monolayer MoS_2 for low power devices.

COOPER BUSSMANN Dublin, CA

Engineering Intern June 2011 – Aug. 2011

- Conducted cyclic voltammetry and electrical impedance spectroscopy studies on asymmetric capacitors

TEACHING AND MENTORSHIP

Research Mentor – Milliron Lab *Fall 2015, Summer 2016 – Summer 2017*

- Mentored engineering undergraduate students Kendall Meyertons and Dainah Pham on their independent research projects on block copolymer solvent annealing that is currently being written up as a paper

Graduate Student Instructor for Phase Transformations – UC Berkeley *Spring 2013*

- Held discussion sessions, graded work, and led students through the upper division phase transformation course in the Materials Science and Engineering department.

SKILLS AND EXPERTISE

MATERIALS CHARACTERIZATION	MATERIALS PROCESSING	MATERIALS SCIENCE
Electron microscopy (SEM, TEM)	Colloidal nanocrystal synthesis	Solid ion conductors
X-ray diffraction and scattering	Polymer composite processing	Metal oxide defect chemistry
Elemental analysis (ICP, XPS, EDS)	Solvent annealing	Polymer assembly
Thermal analysis (TGA, DSC)	Surface modification	Electrochromics
Optical analysis (UV-Vis, FTIR)	Vacuum deposition (sputtering, thermal evaporation)	Nanostructure and small angle x-ray scattering
AC/DC electronic measurements		

PROGRAMMING: MATLAB, C++, Java, LabVIEW

SOFTWARE: IgorPro, ImageJ, Adobe Photoshop

LANGUAGES: English and Malay (spoken and written), Cantonese (spoken)

PUBLICATIONS

1. E.L. Runnerstrom*, **G.K. Ong***, G. Gregoi, D.J. Milliron, "Colloidal Nanocrystal Films Reveal the Mechanism for Intermediate Temperature Proton Conductivity in Porous Ceramics, " Submitted
2. **G.K. Ong**, E.L. Runnerstrom, L. Reimnitz, D.J. Milliron, "Proton Transport Modulation by Tailored Porosity and Acceptor Doping in Nanocrystalline Ceramic Films," In Preparation.
3. **G.K. Ong**, L. Reimnitz, E.L. Runnerstrom, D.J. Milliron, "Degradation Mechanism and Surface Passivation of Proton Conducting Nanocrystallien Ceramic Films," In preparation.

4. **G.K. Ong**, D. Pham, A. Indranada, S. Gibbs, S.H. Cho, B.A. Helms, D.J. Milliron, "Hydrogen Bonding Mediated Assembly of Nanocrystals," In preparation.
5. **G.K. Ong***, D. Pham*, A. Indranada, B.A. Helms, D.J. Milliron, "Assembly of Ligand Stripped Nanocrystals into Phase Separated Morphologies," In preparation.
6. **G.K. Ong*,** C. Saez*, A. Agrawal, S.L Skjaervo, D. Pham, D.J. Milliron "Ultrafast Niobium Oxide Nanorod Near Infrared Electrochromics," In preparation.
7. S. Heo, J. Kim, **G. Ong**, D.J. Milliron, "Template Free Mesoporous Electrochromic Films on Flexible Substrates from Tungsten Oxide Nanorods," *Nano Lett*., (2017), 10.1021/acs.nanolett.7b02730
8. A. Singh, A. Singh, **G.K. Ong**, M. Jones, D. Nordlund, K. Bustillo, J. Ciston, A.P Alivisatos, D.J Milliron, "Dopant Mediated Assembly of Nanorods into Atomically Coupled 2D Free-Floating Sheets in Solution," *Nano Lett*, (2017), 10.1021/acs.nanolett.7b00232
9. A. Agrawal, A. Singh, S. Yazdi, A. Singh, **G. Ong**, K. Bustillo, R.W. Johns, E. Ringe, D.J. Milliron, "Resonant Coupling between Molecular Vibration and localized Surface Plasmon Resonance of Faceted Metal Oxide Nanocrystals," *Nano Lett*., 17, (2017), 2611-2620.
10. **G.K. Ong**, T.E. Williams, A. Singh, E. Schaible, B.A. Helms, D.J. Milliron. "Ordering in Polymer Micelle-Directed Assemblies of Colloidal Nanocrystals," *Nano Lett*., 15, (2015), 8240-8244.
11. J. Kim, **G.K. Ong**, Y. Wang, G. LeBlanc, T.E. Williams, T.M. Mattox, B.A. Helms, D.J. Milliron. "Nanocomposite Architecture for Rapid, Spectrally-Selective Electrochromic Modulation of Solar Transmittance," *Nano Lett*., 15, 8 (2015), 5574-5579.

CONFERENCE PRESENTATIONS

1. **G.K. Ong**, E.L. Runnerstrom, D.J. Milliron, "Colloidal Nanocrystal Films Reveal the Mechanism for Intermediate Temperature Proton Conductivity in Porous Ceramics," *Materials Research Society Spring Meeting, 2016*
2. **G.K. Ong**, D. Pham, B. Helms, D.J. Milliron, "Ordering in Polymer Micelle-Directed Assemblies of Colloidal Nanocrystals and Their Assembly into Equilibrium Morphologies," *Materials Research Society Spring Meeting, 2016*

ACTIVITIES

Professional Development Committee Chair – Tau Beta Pi Honors Society Fall 2011
Team Member – UC Berkeley Solar Vehicle Team *Jan 2010 – Aug. 2011*