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Immigration Status

Perminant US Resident / Green Card Holder

Education

- Dec. 2014 Iowa State University, Ames, IA
Ph.D, Chemical and Biochemical Engineering
Minor, Mechanical Engineering
Advisors: Dr. Kurt R. Hebert , Dr. Pranav Shrotriya
Dissertation: The Role of Stress in Self-Ordering Porous Anodic Oxide Formation and Corrosion of Aluminum
- July 2010 Middle East Technical University, Ankara, Turkey
Bachelor of Science, Chemical Engineering

Research and Work Experience

Postdoctoral Research Assistant, Jan. 2015 – now

Advisors: Nancy Sottos and Scott White

University of Illinois at Urbana-Champaign, Urbana, IL

- Characterize chemo-mechanical deformations in Li-ion battery electrodes.
- Investigate material-based strategies to develop damage tolerant advanced electrode materials for electrochemical energy storage.
- Develop a continuum based mathematical model for Li-ion and solid-state electrolyte batteries.
- Train and mentor four graduate students.
- Collaborate with researchers from *Argonne National Lab., the University of Illinois, Northwestern University* and *Purdue University*.

Research Assistant, Aug. 2010 – Dec. 2014

Advisors: Kurt Hebert and Pranav Shrotriya

Iowa State University, Ames, IA

- Developed a new high-resolution curvature interferometry technique for *in situ* stress measurements in thin films.
- Investigated mass transport and stress-generating mechanisms during the formation of anodic oxide films.
- Developed a mathematical model for the coupling between defect chemistry and stress in oxide films.
- Investigated the surface instability of aluminum during stress corrosion cracking.
- Trained and mentored two graduate students and one visitor scientist.
- Collaborated with researchers from *the National Institute of Standards and Technology, the University of Manchester* and *Universite Catholique de Louvain*.

Undergraduate Researcher, Sep. 2009 – Jan. 2010

Advisor: Önder Özbelge

Middle East Technical University, Ankara, Turkey

- Designed a technique to remove boron from aqueous solution.

Honors and Awards

2013-2014	Preparing Future Faculty (PFF) Scholar Rank, Iowa State University
2013	PAG (Professional Advancement Grant) Award, Iowa State University
2011-2014	Electrochemical Society Awarded Student Membership
2006, 2008, 2010	High Honor Student, Middle East Technical University
2007, 2009	Honor Student, Middle East Technical University

Teaching Experience

Jan-May 2014	Teaching Assistant Department of Chemical and Biochemical Engineering Iowa State University, Ames, IA Course: Computational Methods in Chemical Engineering (CHE 310)
Sept. 2013	Guest Lecturer Department of Chemical and Biochemical Engineering Iowa State University, Ames, IA Course: Transport Phenomena II (CHE 357)
Aug.2013-May 2014	Preparing Future Faculty Scholar Participated in Prepare Future Faculty Program <i>The goal of the program is to better prepare graduate students and postdocs for faculty careers at a variety of institutions through a combination of seminars, mentoring, and practical classroom and departmental service experiences.</i>
Aug. 2011-Jan 2012	Teaching Assistant Department of Chemical and Biochemical Engineering Iowa State University, Ames, IA Course: Process and Plant Design (CHE 430)

Publications (in preparation manuscripts are available upon request)

- Ö. Ö. Çapraz, S. Rajput, K.L. Bassett, A. Gewirth, S. White and N. Sottos, Controlling the Volumetric Expansions in the Lithium Manganese Electrode via Surface Modification, *in preparation*, 2018
- Ö. Ö. Çapraz, S. Rajput, S. White and N. Sottos, Strain Generation Mechanisms in Lithium Manganese Oxide Electrode, *Experimental Mechanics*, Accepted, 2018
- L. Zhao, E. Chenard, Ö. Ö. Çapraz, N. Sottos and S. White, Direct Detection of Manganese Ions in Organic Electrolyte by UV-vis Spectroscopy, *J. Electrochem. Soc.*, 165 (2), A345, 2018, [Link](#)
- Ö. Ö. Çapraz, Q. van Overmeere, P. Shrotriya and K. R. Hebert, Stress Induced by Electrolyte Anion Incorporation in Porous Anodic Aluminum Oxide, *Electrochim. Acta*, 238, 368, 2017, [Link](#)
- Shinsuke Ide, Ö. Ö. Çapraz, P. Shrotriya and K. R. Hebert, Oxide Microstructural Changes Accompanying Pore Formation During Anodic Oxidation of Aluminum, *Electrochim. Acta*, 232, 303, 2017, [Link](#)
- Ö. Ö. Çapraz, K. L. Bassett, A.A. Gewirth and N.R. Sottos, Electrochemical Stiffness Changes in Lithium Manganese Oxide Electrodes, *Adv. Energy Mater.*, 1601778, 2017, [Link](#)
- E.M.C. Jones, Ö. Ö. Çapraz, S.R. White and N.R. Sottos, Reversible and irreversible deformation mechanisms of composite graphite electrodes in lithium-ion batteries, *J. Electrochem.*

Soc., 163, 9, 2016, Link

- **Ö. Ö. Çapraz**, P. Shrotriya and K. R. Hebert, Tensile stress and plastic deformation in aluminum induced by vacancy diffusion during corrosion, *Acta Materialia*, 115, 434, 2016, Link
- **Ö. Ö. Çapraz**, P. Skeldon, G. Thompson, P. Shrotriya and K. R. Hebert, Role of Oxide Stress in the Initial Growth of Self-Organized Porous Aluminum Oxide, *J. Electrochim. Soc.*, 167, 404, 2015, Editor Choice, Link
- **Ö. Ö. Çapraz**, P. Skeldon, G. Thompson, P. Shrotriya and K.R. Hebert, Factors Controlling Stress Generation during the Initial Growth of Porous Anodic Aluminum Oxide, *J. Electrochim. Soc.*, 159, 16, 2015, Link
- **Ö. Ö. Çapraz**, The Role of Stress in Self-Ordered Porous Anodic Oxide Formation and Corrosion of Aluminum, Dissertation (Ph.D.) 2014, Iowa State University, Link
- **Ö. Ö. Çapraz**, P. Shrotriya and K. R. Hebert, Measurements of Stress Changes During Growth and Dissolution of Anodic Oxide Films on Aluminum, *J. Electrochem. Soc.*, 161, D256, 2014, Link
- **Ö. Ö. Çapraz**, K. R. Hebert and P. Shrotriya, In situ Stress Measurement During Aluminium anodizing using, Phase-Shifting Curvature Interferometry, *J. Electrochem. Soc.*, 160, D501, 2013, Link

Presentations given by Ö.Ö. Çapraz at Conferences or Invited Talks

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| May 2018 | The Society of Electrochemical , Northeastern University, Boston, MA
<i>In situ Strain Measurements of Gold-Coated Lithium Manganese Oxide Electrode for Li-Ion Batteries</i> |
| July 2017 | The Society of Engineering Science , Northeastern University, Boston, MA
<i>In situ Strain Measurements of Gold-Coated Lithium Manganese Oxide Electrode for Li-Ion Batteries</i> |
| June 2017 | The Society of Experimental Mechanics , Indianapolis, IN
<i>Mechanical Deformations During Electrochemical Cycling of Lithium Manganese Oxide Electrodes</i> |
| March 2017 | Invited Speaker at Auburn University , Auburn, AL
<i>Chemo-Mechanical Phenomena in Advanced Materials for Energy-related Applications</i> |
| June 2016 | The Society of Experimental Mechanics , Orlando, FL
<i>The Effect of Cycling Rate on Electrochemical Stiffness of Composite Lithium Manganese Oxide Electrodes</i> |
| Feb 2016 | Gordon Research Conference , Ventura, CA
<i>In situ Strain Evolution During Phase Transformation Induced Strain Generation in Cathode Composite Electrodes</i> |
| Oct 2015 | The Material Research Society , Boston, MA
<i>In situ Strain Evolution During Electrochemical Cycling of Lithium Manganese Oxide Cathodes</i> |
| Oct 2014 | The Society of Engineering Science , Lafayette, IN
<i>In-situ Stress Measurement during Aluminum Corrosion in Alkaline Solutions</i> |
| Oct 2014 | The Society of Engineering Science , Lafayette, IN
<i>Stress Evolution of Anodic Films Prior to the Pore Formation</i> |
| Oct 2013 | The Electrochemical Society Meeting , San Francisco, California
<i>Stress Distributions in Anodic Alumina Films Prior to the Onset of Pore Formation</i> |
| Sep 2013 | Invited Speaker at Iowa State University , Ames, Iowa
<i>The Formation of Self-Ordered Nanoporous Anodic Oxide</i> |
| May 2012 | Invited Speaker at Friedrich-Alexander-University , Erlangen, Germany
<i>Influence of Stress on Growth Mechanism of Aluminum Oxide</i> |

Proposal Contributions

March 2017 **Shell Energy**, *Interfacial Control for Self-Stabilizing Solid State Batteries*.

Activities and Affiliations

Mentoring	Mentoring 3 Ph.D., 1 master and 1 undergraduate students at University of Illinois Mentored 2 Ph.D. students and 1 visitor scientist at Iowa State University between 2011-2014
Service	Recycling Batteries Committee Member at the University of Illinois Session Organizer, “Fracture and Fatigue” and “Mechanics and Energetic Materials” Society of Experimental Mechanics (SEM) International Congress, 2017 Reviewer, <i>Electrochimica Acta</i> Reviewer, <i>Journal of Electrochemical Societies</i> Reviewer, <i>Experimental Mechanics</i> Secretary, Chemical Engineering Graduate Student Organization (2011-2013) Lab. Manager, Iowa State University (2010-2014)
Professional Membership	The Electrochemical Society Society of Experimental Mechanics International Society of Electrochemistry Society of Engineering Science
Social Responsibilities	Volunteered for Beckman Open House in 2013 and 2015 Turkish Student Association of Iowa State University (vice-president, 2013- 2014) Volunteered for Winter Weatherization in Ames, Iowa (2011, 2012) Volunteered in International Youth Workcamp at Berlin/Germany

References

Professor Nancy R. Sottos

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University of Illinois at Urbana-Champaign
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Professor Scott R. White

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University of Illinois at Urbana-Champaign
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Professor Kurt R. Hebert

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Professor Pranav Shrotriya

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