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GÖZDE BARIM

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EDUCATION

2013 - 2018	**University of Southern California**, Los Angeles, CA Ph.D. Chemistry Research Advisor: Prof. Richard L. Brutchey
2011 - 2013	**Bilkent University**, Ankara, Turkey M.S. Chemistry Research Advisor: Prof. Ömer Dag
2006 - 2011	**Bilkent University**, Ankara, Turkey B.S. Chemistry Research Advisor: Prof. Ulrike Salzner

RESEARCH EXPERIENCE

Postdoctoral Fellow, Lawrence Berkeley National Laboratory, Berkeley, CA **2019 - Present**

- Synthesis of nanostructured heterostructures for rechargeable batteries
- Structural and electrochemical characterization of electrode materials
- Preparation of heterostructured thin film model systems

Research Assistant, University of Southern California, Los Angeles, CA **2013 - 2018**

- Synthesized polyanionic cathode materials containing Fe, Mo and W by a new route involving in solid-state co-precipitation and solvothermal approaches
- Characterized electrochemical and structural properties of intercalation electrode materials by a wide spectrum of techniques including: synchrotron and in situ X-ray diffraction, neutron diffraction, total neutron scattering, X-ray absorption spectroscopy and galvanostatic electrochemical cycling
- Demonstrated cooperative polyhedral rotational distortions in the polyanionic intercalation cathodes upon reversible Li^+ and Na^+ insertion by symmetry-mode analysis and Rietveld refinement
- Developed low-temperature solution-based routes for the synthesis of well-defined colloidal nanocrystals with a high degree of phase control
- Demonstrated simultaneous control of phase, composition, size and shape in binary nickel sulfide nanocrystals by tuning reactivities of substituted thioureas
- Established rational access of metastable phases of ternary Cu-In-Se nanocrystals through a molecular-programming approach based on the bond dissociation energies of diselenide precursors

Research Assistant, Bilkent University, Ankara, Turkey **2011 - 2013**

- Synthesized the LiI-non-ionic surfactant (10-lauryl ether, $C_{12}EO_{10}$ and Pluronics) lyotropic liquid crystalline (LLC) mesophases by solution-based routes under ambient conditions
- Investigated structural and physical properties of LiX-non-ionic surfactant (X = Cl, Br, I, NO_3) lyotropic liquid crystalline mesophases via a broad range of characterization techniques
- Prepared non-ionic surfactant-lithium salt gel electrolytes containing I^-/I_3^- redox couple
- Determined impacts of the redox couple on the structure and electrical conductivity of the LLC phases
- Fabricated and tested dye-sensitized solar cells containing gel electrolytes made from lyotropic liquid crystals

Undergraduate Researcher, Bilkent University, Ankara, Turkey **2010 - 2011**

- Investigated the donor-acceptor systems by using Density Functional Theory (DFT) to determine the effect of donor-acceptor substitution on the electronic structure of copolymers
- Computed the band characteristics of 2-benzothiophene-thiophene, thieno[3,4-b] pyrazine-thiophene and benzotiadiazole-ethylenedioxythiophene copolymers via DFT
- Determined the structures, HOMO-LUMO gaps, ionization potentials and cation properties of these copolymers

Undergraduate Researcher, Middle East Technical University, Ankara, Turkey **June - July 2010**

- Synthesized acyl phosphonates
- Analyzed NMR results
- Operated GC-MS, LC-MS and HPLC instruments

Research Advisor: Prof. Ayhan Sitki Demir

TEACHING EXPERIENCE

University of Southern California, Department of Chemistry, Los Angeles, CA **2013 - 2017**

- Led general chemistry laboratory sections of 18 undergraduate students for four semesters
- Lectured laboratory course and supervised laboratory exercises
- Graded laboratory reports, quizzes and exams

Bilkent University, Department of Chemistry, Ankara, Turkey **2010 - 2013**

- Led physical chemistry laboratory sections of 35 undergraduate students for four semesters and general physics laboratory sections of 25 undergraduate students for a semester
- Lectured laboratory course and supervised laboratory exercises
- Graded laboratory reports, quizzes and exams

PUBLICATIONS

1. Mora-Tamez, L.; **Barim, G.**; Downes, C.; Williamson, E. M.; Habas, S. E.; Brutchey, R. L. Controlled Design of Phase- and Size-tunable Monodisperse N_2P Nanoparticles in a Phosphonium-based Ionic Liquid through Response Surface Methodology (RSM). *Chem. Mater*. **2019**, *31*,1552-1560. DOI: 10.1021/acs.chemmater.8b04518
2. **Barim, G.**; Smock, S. R.; Antunez, P. D.; Glaser D.; Brutchey, R. L. Phase Control in the Colloidal Synthesis of Well-Defined Nickel Sulfide Nanocrystals. *Nanoscale* **2018**, *10*, 16298-16306. DOI: 10.1039/c8nr05208e
3. Tappan, B. A.; **Barim G.**; Kwok, J.; R. L. Brutchey, Utilizing Diselenide Precursors Towards the Rationally Controlled Synthesis of Metastable $CuInSe_2$ Nanocrystals. *Chem. Mater*. **2018**, *30*, 5704-5713. DOI: 10.1021/acs.chemmater.8b02205
4. **Barim, G.**; Cottingham, P.; Zhou, S.; Melot, B. C.; Brutchey, R. L. Investigating of the Mechanism of Reversible Lithium Insertion into Anti-NASICON $Fe_2(WO_4)_3$. *ACS Appl. Mater. Interfaces* **2017**, *9*, 10813-10819. DOI: 10.1021/acsami.6b16216
5. Yılmaz, E.; Olutas, E. B.; **Barim, G.**; Bandara, J.; Dag, Ö. Lithium Salt-Nonionic Surfactant Lyotropic Liquid Crystalline Gel-Electrolytes with Redox Couple for Dye Sensitized Solar Cells. *RSC Advances* **2016**, *6*, 97430-97437. DOI: 10.1039/C6RA19979H
6. Zhou, S.†; **Barim, G.**†; Morgan, B. J.; Melot, B. C.; Brutchey, R. L. Influence of Rotational Distortions on Li^+- and Na^+-Intercalation in Anti-NASICON $Fe_2(MoO_4)_3$. *Chem. Mater*. **2016**, *28*, 4492-4500. († these authors contributed equally) DOI: 10.1021/acs.chemmater.6b01806

7. Albayrak, C.; **Barim, G.**; Dag, Ö. Effect of Hygroscopicity of the Metal Salt on the Formation and Air Stability of Lyotropic Liquid Crystalline Mesophases in Hydrated Salt-Surfactant Systems. *J. Colloid Interface Sci.* **2014**, *433*, 26-33. DOI: 10.1016/j.jcis.2014.07.008
8. **Barim, G.**; Albayrak, C.; Yılmaz, E.; Dag, Ö. Highly Conducting Lyotropic Liquid Crystalline Mesophases of Pluronics (P65, P85, P103, and P123) and Hydrated Lithium Salts (LiCl and $LiNO_3$). *Langmuir* **2014**, *30*, 6938-6945. DOI: 10.1021/la5006105
9. Albayrak, C.; **Barim, G.**; Dag, Ö. Lyotropic Liquid Crystal to Soft Mesocrystal Transformation in Hydrated Salt–Surfactant Mixtures. *Chem. Eur. J.* **2013**, *19*, 15026-15035. DOI: 10.1002/chem.201301662

INTERNATIONAL CONFERENCE PRESENTATIONS

1. **G. Barim** and R. L. Brutchey, *"Synthetic Phase Control over Colloidal Nickel Sulfide Nanocrystals*," **255th ACS National Meeting**, March 2018, New Orleans, LA. *(oral presentation)*
2. **G. Barim**, P. Cottingham, S. Zhou, B. C. Melot and R. L. Brutchey, *"Effect of Polyhedra Rotations on Li^+ and Na^+-ion Intercalation into Anti-NASICON $Fe_2(MO_4)_3$ (M = Mo, W)*," **North American Solid State Chemistry Conference**, August 2017, Santa Barbara, CA. *(poster presentation)*
3. B. A. Tappan, **G. Barim**, and R. L. Brutchey, "*Kinetically Accessing Metastable Phases of Ternary MetalChalcogenide Nanocrystals," **North American Solid State Chemistry Conference**, August 2017, Santa Barbara, CA. *(poster presentation)*
4. **G. Barim**, P. Cottingham, S. Zhou, B. C. Melot and R. L. Brutchey, *"Investigation of Reversible Li^+ Intercalation into Anti-NASICON $Fe_2(WO_4)_3$*," **253rd ACS National Meeting**, April 2017, San Francisco, CA. *(oral presentation)*
5. **G. Barim**, S. Zhou, B. C. Melot and R. L. Brutchey, *"Effect of Rotational Polyhedra Distortions on Guest Ion Intercalation in Anti-NASICON $Fe_2(MoO_4)_3$*," **251st ACS National Meeting**, March 2016, San Diego, CA. *(oral presentation)*
6. S. Zhou, B. C. Melot, **G. Barim** and R. L. Brutchey, *"Effect of Polyhedral Rotational Distortions on the Electrochemical Properties of Polyanionic Intercalation Electrode Materials*," **251st ACS National Meeting**, March 2016, San Diego, CA. *(poster presentation)*
7. E. Tunkara, C. Albayrak, **G. Barim**, and Ö. Dag, *"Lyotropic Liquid Crystalline Mesophase of $[Zn(H_2O)_6](NO_3)_2$-$C_{12}EO_{10}$ and Its Electrochemical Conversion into Porous Thin Films," **Internationally Participated Electrochemistry Workshop***, June 2013, Mugla, Turkey. *(poster presentation)*
8. **G. Barim**, C. Albayrak and Ö. Dag, "*Ionic Conductivity through Lyotropic Liquid Crystalline Mesophases of Lithium Salt-Nonionic Surfactants*," **Internationally Participated Electrochemistry Workshop**, June 2013, Mugla, Turkey. *(poster presentation)*
9. C. Albayrak, C. Karakaya, Y. Türker, **G. Barim**, and Ö. Dag, "*Molten Salt Assisted Self-Assembly: Modification of Mesoporous Silica and Titania Thin Films with Metal Oxides*," **3rd International Conference on Multifunctional and Hybrid Nanomaterials**, March 2013, Sorrento, Italy. *(oral presentation)*
10. **G. Barim**, C. Albayrak and Ö. Dag, *"Incorporation of I^-/I_2 into Mesophases of Lithium Salt Non-ionic Surfactants*," **26th Annual Meeting of Turkish Chemical Society**, October 2012, Mugla, Turkey. *(poster presentation)*
11. **G. Barim**, C. Albayrak and Ö. Dag, *"Lyotropic Liquid Mesophases of Lithium Salt Non-ionic Surfactants*," **14th International Conference on Organized Molecular Films (ICOMF14)**, July 2012, Paris, France. *(oral presentation)*
12. **G. Barim**, C. Albayrak and Ö. Dag, *"Investigation of Lyotropic Liquid Mesophases of Lithium Salt Non-ionic Surfactant System*," **8th Nanoscience and Nanotechnology Congress (NanoTR8)**, June 2012, Ankara, Turkey. *(poster presentation)*

TECHNICAL SKILLS

- Synthesis of chalcogenide, oxide and noble metal nanocrystals via low-temperature, solution-based routes
- Sol-gel, solvothermal and solid-state syntheses of functional materials, including proficiency in Schlenk and glovebox manipulations and chemical purification
- Preparation of battery cells and extensive knowledge of structural and electrochemical characterization
- Thin-film, solution-phase and powder characterization using X-Ray Diffraction (XRD), Transmission Electron Microscopy (TEM), Scanning Electron Microscopy (SEM) with Energy Dispersive X-ray Spectroscopy (EDS), Rietveld Refinement, Pair Distribution Function Analysis (PDF), X-ray Absorption Spectroscopy (XAS), X-ray Photoelectron Spectroscopy (XPS), Thermogravimetric Analysis (TGA), Differential Scanning Calorimetry (DSC), Raman Spectroscopy, FT-IR Spectroscopy, UV-Vis Spectroscopy, Nitrogen Sorption via BET Method, Nuclear Magnetic Resonance Spectroscopy (NMR), Inductively Coupled Plasma-Optical Emission Spectrometry (ICP-OES), Polarize Optical Microscopy (POM), High Performance Liquid Chromatography (HPLC), Gas Chromatography-Mass Spectrometry (GC-MS),
- Electrochemical characterization of electrode materials: galvanostatic electrochemical cycling and Impedance Spectroscopy
- Software: GSAS, OriginPro, ChemDraw, Gaussian 09, GaussView, Gabedit, Matlab, PyMol, BioLogic Potentiostat, PDFgui

AWARDS & HONORS

Berkeley Science Fellow, Berkeley Postdoctoral Entrepreneur Program	**2019 - present**
WiSE Travel Grant, Women in Science and Engineering at USC	**January 2018**
Outstanding Referee Award, Materials Research Bulletin, Elsevier	**November 2017**
Full Member, Sigma Xi, The Scientific Research Honor Society	**November 2017**
Travel Grant, USC Department of Chemistry	**March 2017**
Fellowship, TUBITAK (Scientific & Technological Research Council of Turkey)	**2012 - 2013**
Scientific Travel Grant, TUBITAK	**July 2012**
Full Scholarship, Bilkent University	**2007 - 2013**
High honor degrees in six semesters during undergraduate study (Dean's list)	**2007 - 2011**
Honor Award, Ak-kim Chemical Industry for the organization of Chemistry in All Dimensions Symposium	**December 2011**

ACADEMIC SERVICE & LEADERSHIP

Member, User Executive Committee of the Molecular Foundry	**2020 - present**
Board Member, Berkeley Lab Postdoc Association	**2019 - present**
Ad hoc referee, Materials Research Bulletin	**2017 - present**
Grand award judge, Intel International Science & Engineering Fair	**May 2017**
President, Trojan Speech Toastmasters at USC	**2017 - 2018**
Board Member, USC Turkish Student Association	**2017 - 2018**
Media specialist, USC Women in Chemistry	**2016 - 2018**
Secretary, Toastmasters Trojan Speech	**2016 - 2017**
Member, American Chemical Society	**2011 - present**
Member, Turkish Chemical Society	**2011 - present**
Member, Young Chemists' Platform	**2011 - present**
Co-founder and Vice President, Bilkent Chemistry Club	**2010 - 2013**
Player, Bilkent University Women's Basketball Team	**2006 - 2011**

SCIENTIFIC CONGRESS & WORKSHOPS

Rietveld Refinement & Indexing Workshop, September 2015, Newton Square, PA *(Participant)*
Renewable Energy for Our Future Conference, October 2011, Ankara, Turkey *(Organization Committee Member)*
IYC2011 Chemistry in All Dimensions Symposium, October 2011, Ankara, Turkey *(Organization Committee Member)*
2nd National Chemistry Education Congress, July 2011, Erzurum, Turkey *(Participant)*
SCAN2010 (Synthesis, Characterization and Applications of Nanomaterials Workshop & School), October 2010, Ankara, Turkey *(Participant)*
1st National Nanotechnology Day, April 2007, Ankara, Turkey *(Participant)*

REFERENCES

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