DANIELA R. RADU

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EDUCATION

Ph.D. in Chemistry (2004)
Iowa State University, Ames, IA, USA
Advisor: Professor Victor S.-Y. Lin

M.S. in Chemistry (1996)
"Babes-Bolyai" University, Cluj-Napoca, Romania
Advisor: Professor Paul S. Agachi

B.S. in Chemical Engineering (1994)
"Babes-Bolyai" University, Cluj-Napoca, Romania

PROFESSIONAL EXPERIENCE

Associate Professor with Tenure
Department of Chemistry, Delaware State University, Dover, DE — August 2017 – Present

Affiliated Professor
Department of Materials Science and Engineering, University of Delaware Newark, DE — October 2015 – Present

Assistant Professor, Tenure-Track
Department of Chemistry, Delaware State University, Dover, DE — January 2013 – July2017

Senior Research Scientist
DuPont CR&D, Experimental Station, Wilmington, DE — August 2010 – December 2012

Research Scientist
DuPont Central Research and Development, Experimental Station Wilmington, DE — October 2007 – July 2010

Postdoctoral Research Fellow
The Scripps Research Institute, La Jolla, CA — January 2005 – September 2007

CURRENT RESEARCH INTERESTS

- Nanostructured materials for solution-processed solar photovoltaics: Gen 2 PV (thin film crystalline absorbers)
- Advanced functional materials for optoelectronic applications: 2D nanostructures and lasing materials
- Chalcogenide nanoparticles for photothermal cancer therapy: Cu_xS (*collaborative project*)
- Sensor design: detecting heavy metals, nitrates and phosphates in water (*collaborative project*)
- Engineered nanoparticles: toxicity evaluation *(collaborative project)*

AWARDS AND HONORS

2016 Junior Faculty Teaching Excellence Award, Delaware State University, College of Mathematics, Natural Sciences and Technology
2014 Junior Faculty Research Excellence Award, Delaware State University, College of Mathematics, Natural Sciences and Technology
2014 PRIDE Innovation Award, Delaware State University

PUBLICATIONS

1. "Sulvanite" (Cu_3VS_4) Nanocrystals for Printable Thin Film Photovoltaics", Chen, C.-C.; Stone, K. H.; Lai, C.-Y.; Dobson, K. D.; **Radu, D. R.** *Materials Letters* **2018, 211, 17**.
2. "Synthesis of Fe_2GeS_4 via a Rapid Molecular Precursor-Based Solid State Route", Hwang, P.-Y.; Berg, D.; Liu, M.; Lai, C.-Y.; Dobson, K.; Radu, D. *Submitted to Journal of Materials Science*.

3. Liu, M.; Berg, D.; Hwang, P.-Y.; Lai, C.-Y.; Babbe, F.; Dobson, K.; Radu, D. The Promise of Solution Processed Fe2GeS4 Thin Films in Iron Chalcogenide Photovoltaics *Journal of Materials Science*, ***in revision***.

4. "Absorption and scattering cross-section extinction values of silver nanoparticles", Hlaing, M.; Gebear-Eigzabher, B.; Roa, A.; Marcano, A.; **Radu, D.R.**; Lai, C.-Y. *Optical Materials* **2016**, *58*, 439-444.

5. "Functionalized stellate macroporous silica nanospheres for CO_2 mitigation", **Radu, D. R.**; Pizzi, N. A.; Lai, C.-Y. *Journal of Materials Science* **2016**, *51*, 10632–10640.

6. "Chalcogenide Nanoparticles Precursor in Thin-Film Photovoltaics—Processing Limitations", **Daniela R. Radu**, Dominik Berg, Mimi Liu, Kevin Dobson, Po-Yu Hwang and Cheng-Yu Lai, 43rd IEEE Photovoltaics Specialists Conference Proceedings, **2016**

7. "Enzyme Immobilization on Mesoporous Silica Supports", Lai, Cheng-Yu; Radu, **Daniela R.**; Heterogeneous Catalysts for Today's Challenges, Royal Society of Chemistry (**2015)**

8. "Heterogeneous Catalysts for Biodiesel Production", **Radu, Daniela R.,** George A. Kraus, *Heterogeneous Catalysts for Today's Challenges*, Royal Society of Chemistry (**2015)**

9. **"**Novel Solution Process for Fabricating Ultra-Thin-Film Absorber Layers in Fe_2SiS_4 and Fe_2GeS_4 Photovoltaics" Orefuwa, S. A.; Lai, C.-Y.; Dobson, K.; Ni, C.; Radu, D. *MRS Online Proceedings Library* **2014**, 1670, M3 - 10.1557/opl.2014.507.

10. "High-Efficiency Solution-Processed $Cu_2ZnSn(S,Se)_4$ Thin-Film Solar Cells Prepared from Binary and Ternary Nanoparticles" Cao, Y.; Denny, M. S.; Caspar, J. V.; Farneth, W. E.; Guo, Q.; Ionkin, A. S.; Johnson, L. K.; Lu, M.; Malajovich, I.; Radu, D.; Rosenfeld, H. D.; Choudhury, K. R.; Wu, W. (authors listed alphabetically) *Journal of the American Chemical Society* **2012,** *134* (38), 15644-15647. http://pubs.acs.org/doi/full/10.1021/ja3057985

11. "Reversible binding and fluorescence energy transfer between surface-derivatized CdS nanoparticles and multi-functionalized fluorescent mesoporous silica nanospheres" Lai, C.-Y.; Wu, C.-W.; Radu, D. R.; Trewyn, B. G.; Lin, V. S.-Y. *Studies in surface science and catalysis* **2007**, 170, 1827-1835 http://www.sciencedirect.com/science/article/pii/S0167299107810664

12. "Fine-tuning the degree of organic functionalization of mesoporous silica nanosphere materials via an interfacially designed co-condensation method" Radu, D. R.;Lai C-Y; Huang J.; Shu X.; Lin, V. S.-Y. *Chemical Communications* **2005**, (10) 1264-1266. http://dx.doi.org/10.1039/B412618A

13. "Real-Time Imaging of Tunable Adenosine 5-Triphosphate Release from an MCM-41-Type Mesoporous Silica Nanosphere-Based Delivery System" Gruenhagen, J. A.; Lai, C.-Y.; **Radu, D. R.;** Lin, V. S. Y.; Yeung, E. S. *Appl. Spectrosc.* **2005,** *59* (4), 424-431. http://as.osa.org/abstract.cfm?URI=as-59-4-424

14. "A Polyamidoamine Dendrimer-Capped Mesoporous Silica Nanosphere-Based Gene Transfection Reagent" **Radu, D. R**.; Lai, C.-Y.; Jeftinija, K.; Rowe, E. W.; Jeftinija, S.; Lin, V. S.-Y. *Journal of the American Chemical Society* **2004,** *126* (41), 13216-13217. http://dx.doi.org/10.1021/ja046275m

15. "Gatekeeping Layer Effect: A Poly(lactic acid)-coated Mesoporous Silica Nanosphere-Based Fluorescence Probe for Detection of Amino-Containing Neurotransmitters" **Radu, D. R**.;, Lai C-Y; Wiench J.W.; Pruski M.; Lin, V. S.-Y. *Journal of the American Chemical Society* **2004,** *126*(6), 1640-1641. http://dx.doi.org/10.1021/ja038222v

16. "Organosulfonic acid-functionalized mesoporous silicas for the esterification of fatty acids" Mbaraka, I. K.; **Radu, D. R**.; Lin, V. S. Y.; Shanks, B. H., *Journal of Catalysis* **2003**, 219 (2), 329-336. http://www.sciencedirect.com/science/article/pii/S0021951703001933

17. "Oxidative Polymerization of 1,4-Diethynylbenzene into Highly Conjugated Poly(phenylene butadiynylene) within the Channels of Surface-Functionalized Mesoporous Silica and Alumina Materials" Lin, V. S.-Y.; **Radu, D. R**.; Han, M.-K.; Deng, W.; Kuroki, S.; Shanks, B. H.; Pruski, M. *Journal of the American Chemical Society* **2002,** *124* (31), 9040-9041. http://pubs.acs.org/doi/abs/10.1021/ja025925o

GRANTED PATENTS

1. "Nanoscale precursors for synthesis of Fe(Si,Ge)(S,Se)crystalline particles and layers" Radu, Daniela Rodica, Cheng-Yu Lai, US 9634161 (**2017**)

2. "Processes for preparing copper tin sulfide and copper zinc tin sulfide films" Johnson, Lynda Kaye; Lu, Meijun; Catron, John W., Jr.; Radu, Daniela Rodica WO 2010135667 (**2011**)

3. "Copper tin sulfide and copper zinc tin sulfide ink compositions" Johnson, Lynda Kaye; Catron, John W.; Radu, Daniela Rodica US 9112094 (**2010**)

4. "Copper zinc tin chalcogenide nanoparticles" Radu, Daniela Rodica; Caspar, Jonathan V.; Johnson, Lynda Kaye; Rosenfeld, H. David; Malajovich, Irina; Lu, Meijun WO 2010135622 (**2010**).
5. "Aqueous process for producing crystalline copper chalcogenide nanoparticles, the nanoparticles so-produced, and inks and coated substrates incorporating the nanoparticles" Johnson, Lynda Kaye; Radu, Daniela Rodica; Lai, Cheng-Yu; Lu, Meijun; Malajovich, Irina WO 2011066205 (**2011**)
6. "Copper zinc tin chalcogenide nanoparticles" Radu, Daniela Rodica; Caspar, Jonathan V.; Johnson, Lynda Kaye; Rosenfeld, H. David; Malajovich, Irina; Lu, Meijun WO 2010135622 (**2010**)
7. "Use of functionalized mesoporous silicates to esterify fatty acids and transesterify oils" Lin, V. S.-Y. and Radu D. R., US 7122688 (**2006**).

PRESENTATIONS

1. "Chalcogenide nanomaterials in thin-film photovoltaics", Daniela Radu, Cheng-Yu Lai, Mimi Liu, Po-Yu Hwang, Dominik Berg, Ching-Chin Chen, Kevin Dobson, 254th ACS National Meeting & Exposition, Washington, DC, August 20-24, **2017**, *Talk*
2. "Chalcogenide Nanoparticles Precursor in Thin-Film Photovoltaics—Processing Limitations" Daniela Radu, Mimi Liu, Kevin Dobson, Po-Yu Hwang, Cheng-Yu Lai, 43rd IEEE Photovoltaics Specialists, Portland OR, **2016,** *Poster*
3. "Infusing Sustainability Concepts in Undergraduate Chemistry Research" Daniela R. Radu, Dominique Powell, Nicholas Pizzi, Lourdjina Cherenfant, Cheng-Yu Lai, HBCU-UP/CREST PI/PD Meeting, Washington, DC on February 24-25, **2016**, *Poster*
4. "Elemental Loss in Thin-Film PV Originated from Nanoparticles Precursors", Daniela Radu, Dominik Berg, Mimi Liu, Kevin Dobson, Po-Yu Hwang, Cheng-Yu Lai, 252th ACS National Meeting & Exposition, Philadelphia PA, **2016**, *Talk*
5. "Iron chalcogenide nanocolloids for spray-printed solar cells" Daniela Radu, 250th ACS National Meeting 250th ACS National Meeting, Boston, MA, August 16-20, **2015**, *Talk*
6. "Nanosheet-like silica nanoparticles for CO_2 capture", Cheng-Yu Lai , Nicholas Pizzi , Daniela Radu, 250th ACS National Meeting, Boston, MA, August 16-20, **2015** *Talk*
7. "Chalcogenide nanostructured precursors in fabrication of polycrystalline absorber layers in thin-film photovoltaics" Daniela Radu, 249th National American Chemical Society Meeting , March 22-26, **2015**, Denver, CO, *Invited Talk*
8. "Iron chalcogenide nanoparticle precursors for solution processed photovoltaics and other applications", Bellsabel Gebear-Eigzabher , Po-Yu Hwang, Cheng-Yu Lai, Daniela Radu 250th ACS National Meeting, Boston, MA, August 16-20, **2015**, *Poster*
9. "Ultra-Thin-Film Fe_2SiS_4 and Fe_2GeS_4-Based Solar Cells Prepared from Solution Precursors", 29th European Photovoltaic Solar Energy Conference and Exhibition (EU PVSEC 2014), September 22-26, **2014**, Amsterdam, The Netherlands, *Poster*

GRANTMANSHIP (*2013-present*)

Completed

1. 02/01/2014-01/31/2015 "Benchtop Transmission Electron Microscope (TEM) with Electron Diffraction (ED) and Scanning Electron Microscope (SEM) Capabilities for Analysis of Inorganic Solar Cells"
$188,800, DoD, Role: PI
2. 08/26/2013-08/25/2014 "Affordable Solar Thin Film Technologies Based on Sustainable Materials" – $***20,000, 2020 PRIDE Innovation Award, DSU Office of the Provost, Role: PI***
3. 10/21/2014-10/20/2015 "Green Chemistry and Climate Change Aspects – Live!"
$2,000 DSU-Center of Teaching and Learning, Role: PI
4. 09/30/2013-09/30/2017, "High-Efficiency Thin-Film Fe_2SiS_4 and Fe_2GeS_4- Based Solar Cells Prepared from Low-Cost Solution Precursors"
$326,139 DOE SunShot, Role: PI
5. 07/01/2014- 06/30/2017 "Novel Silica Nanostructured Platforms with Engineered Surface Functionality and Spherical Morphology for Low-Cost High-Efficiency Carbon Capture in Advanced Fossil Energy Power"
$249,291 DOE, Role: Co-PI
6. 08/01/2014- 07/31/2017 "Target Infusion Project: Enhancement of Undergraduate Chemistry Curriculum at Delaware State University through Integration of Sustainable Chemistry Course and Laboratory"

$324,182 NSF, Role: Co-PI

7. 09/01/2014-08/31/2017 “Non-Food Cellulosic Biomass Conversion to Fructose by a Dual-Enzyme Biocatalyst”

$299,609 USDA, Role: Co-PI

8. 08/01/2014-07/31/2017 “MRI: Acquisition of an X-Ray Photoelectron Spectrometer”

$575,000, NSF, Role: Key Personnel

Current

9. 09/01/2015-08/31/2018 “Advanced Nanomaterials for Energy Research and Applications (ANERA)”

$999,246 NSF, Role: Co-PI

10. 08/01/2015-01/31/2018 “EAGER: Education through Innovative Research: Novel Plasmonic Semiconductors”

$98,588 NSF, Role: PI

11. 09/01/2015-08/31/2018 “Determination of Metals and Trace elements in Water, Food and Environmental Wastes by simultaneous Inductively Coupled Plasma atomic emission spectrometers”

$149,788 USDA, Role: PI

12. 10/01/2017-09/13/2020 "Targeted Infusion Project: A MakerLab at Delaware State University

$399,672 NSF, Role: PI

13. 09/01/2017-08/31/2022 “Promoting Engagement and Access in Science” (DSU-PEAS)

$1,050,000 Howard Hughes Medical Institute, Role: Co-PI

14. 09/20/2017-09/19/2018 “Chemical and Electrical Properties Mapping by Nano FT-IR”

$495,700.00 DoD, Role: PI

Note. Pending support: DoD, PI ($600,000) ; NSF EPSCoR, Subproject Co-Lead (Radu request $785,000)

SYNERGISTIC ACTIVITIES

- “Sustainable Chemistry Seminar”–seminar series organizer, Department of Chemistry, DSU, Spring 2013
- Member of the Faculty Senate Research Committee at Delaware State University, 2014-present
- U.S. EPA Region III (North-Atlantic) Faculty liaison and Lead of EPA-certified Water Lab Initiative; 2014-2016
- Panel reviews: *DOE SunShot*, Spring 2015; *NSF*, Spring 2016, Fall 2016; *DOD& DOE*: Graduate Fellowships
- Ph.D. Thesis committee member: Esosa Iriowen (URM, Graduated May 2015), Jamie White (URM, Graduated May 2016)

STUDENT AND POSTDOC MENTORING ACTIVITIES

Undergraduate Students: research projects

Rebecca Mears (Woman, STEM major); Nicholas Pizzi (Air Force veteran, STEM major) Undergraduate research project (9-month), Kevin Smith (African-American, Agricultural Sciences major); Lourdjina Cherenfant Chemistry Major (Woman, African-American); Geraldine Valdez STEM student (Women, Hispanic, Biology major Chemistry minor); Jada Davis (Woman, African-American, Chemistry major); Brittany M. Marsh (Women, African-American); Brianna Buttler (Women African-American); Marissa Arnell (Women African-American); Kyounghyen Lee (Exchange Student from South-Korea, Chemistry Major); Miranda Penney (Woman, Chemistry and Biology co-major); Dylan McConnell (First generation in college, Chemistry major); Aaron Legar (US National Guard, Chemistry, Forensic Science co-major); Jeremy Murphy (African-American Biology major Chemistry minor); Douglas Austin (African-American Chemistry major)

Graduate Students

M.S. Students: Yazmine Thomas: M.S. Summer, 2017—URM, *currently Ph.D. student Univ. of Maryland, Eastern Shore*); Nichols Pizzi (co-adviser): M.S. Summer, 2017, *Air Force Veteran, currently Ph.D. Student Thomas Jefferson University*.

Ph.D Students: Bellsabel Gebear-Eighzabher (URM, Ph.D. 2017 Fall), Ms. Mimi Liu, Ms. Anjuli Bhandari (URM)

Postdoctoral Associates/Visiting Scientists

Dr. Samuel Orefuwa, 2014 (URM, currently scientist at BASF); Dr. Dominik Berg (2015-2017, currently at Rowan University); Dr. Ching-Chin Chen (2016-2017, currently at National Taiwan University).

COLLABORATORS

Dr. Robert Birkmire, Institute of Energy Conversion, University of Delaware (UD) ; Dr. Jason Baxter, Drexel University; Dr. Jeffrey L. Caplan, Delaware Biotechnology Institute; Dr. Kevin Dobson, Institute of Energy Conversion, UD; Dr. Jesse Frantz, U.S. Naval Research Laboratory; Dr. Gabriel Gwanmesia, Delaware State University (DSU); Dr. Joy Halley, US Air Force Laboratory; Dr. Kevin Hunter Stone, Stanford Linear Accelerator Center (SLAC) National Laboratory; Dr. Feng Jiao, UD; Dr. Paul Kapke, Iowa State University, Dr. Cheng-Yu Lai, DSU; Dr. Aristides Marcano, DSU; Dr. Kent Messer, UD; Dr. Matthew Pelton, Univ. of Maryland, Baltimore County; Dr. Robert Opila, UD; Dr. Gulnihal Ozbay, DSU; Dr. Dionisos Vlachos, UD; Dr. Yushan Yan, UD.

GRADUATE AND POSTDOCTORAL ADVISORS

Dr. Victor S.-Y. Lin—Ph.D. Advisor (Deceased)
Dr. M. Reza Ghadiri, The Scripps Research Institute, Ja Jolla, CA—Post-doctoral Advisor

REFERENCES *provided separately upon request*