

## **DANIELA R. RADU, Ph.D.**

Associate Professor, Mechanical and Materials Engineering, College of Engineering and Computing  
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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

Thesis Advisor: Professor Paul S. Agachi

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### **PROFESSIONAL EXPERIENCE**

#### **Associate Professor with Tenure**

##### **Diversity Mentor Professor**

Department of Mechanical and Materials Engineering

Florida International University, Miami, FL 33174

August 2018 – Present

##### **Associate Dean**

College of Mathematics, Natural Sciences and Technology

Delaware State University, Dover, DE

January 2018 – July 2018

##### **Associate Professor with Tenure**

Department of Chemistry, Delaware State University, Dover, DE

August 2017 – July 2018

##### **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 – July 2017

##### **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

##### **Research Scientist**

National Institute for Research and Development of Isotopic  
and Molecular Technologies Cluj-Napoca

January 1995-July 2000

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### **CURRENT RESEARCH INTERESTS**

- Advanced functional materials for optoelectronic applications: 2D nanostructures, magnetic, lasing and superconductor nanomaterials
- Nanostructured materials for solution-processed solar photovoltaics: Gen 2 PV (thin film crystalline absorbers)
- Sensor design: detecting heavy metals, nitrates and phosphates in water
- Engineered nanoparticles: toxicity evaluation

## AWARDS AND HONORS

2014 PRIDE Innovation Award, Delaware State University

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

2018 Faculty Research Excellence Award, Delaware State University

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## PUBLICATIONS

1. "Sulvanite" ( $\text{Cu}_3\text{VS}_4$ ) 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*, 179-182.
2. "The Promise of Solution Processed  $\text{Fe}_2\text{GeS}_4$  Thin Films in Iron Chalcogenide Photovoltaics" Liu, M.; Berg, D.; Hwang, P.-Y.; Lai, C.-Y.; Babbe, F.; Dobson, K.; Radu, D. *Journal of Materials Science* **2018**, *53*, 7725-7734.
3. "A rapid molecular precursor solid-state route to crystalline  $\text{Fe}_2\text{GeS}_4$  nanoparticles", Hwang, P.-Y.; Berg, D.; Liu, M.; Lai, C.-Y.; **Radu, D.R.** *Materials Letters* **2018**, *223*, 128-132.
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  $\text{CO}_2$  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, 43<sup>rd</sup> 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  $\text{Fe}_2\text{SiS}_4$  and  $\text{Fe}_2\text{GeS}_4$  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  $\text{Cu}_2\text{ZnSn}(\text{S},\text{Se})_4$  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>

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## 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).

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## RECENT 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. “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*
4. “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*
5. “Nanosheet-like silica nanoparticles for CO<sub>2</sub> capture”, Cheng-Yu Lai, Nicholas Pizzi, Daniela Radu, 250th ACS National Meeting, Boston, MA, August 16-20, **2015** *Talk*
6. “Chalcogenide nanostructured precursors in fabrication of polycrystalline absorber layers in thin-film photovoltaics” Daniela Radu, 249<sup>th</sup> National American Chemical Society Meeting, March 22-26, **2015**, Denver, CO, *Invited Talk*
7. “Ultra-Thin-Film Fe<sub>2</sub>SiS<sub>4</sub> and Fe<sub>2</sub>GeS<sub>4</sub>-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*

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## 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

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## 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

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