

Professional Development Assignment (Spring 2017)
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I have spent my PDA period largely at the University of Memphis. I have utilized my PDA period effectively in writing proposals, manuscripts, and initiating a new research direction in my laboratory.

Federal Proposals Submitted:

NSF-MRI: Acquisition of Direct Metal Printing Machine, Co-PI, 01/2017, Not funded

Internal proposals submitted

Novel PMMA bone cement-phase change material composite, Co-PI, Team initiation Grant, University of Memphis, 2/2017, Not funded

Engineering Materials for Battery: Nanowhiskered Oxide Electrodes, PI, FIT-DRONES cluster, 1/27, Funded

Nano-Enabled Energy Storage Device: Nanoengineering Approach, PI, FIT-Biologicistic cluster, 1/2017, Funded

White Papers submitted:

Novel Thermoelectric Materials from Resonance Phonon Scattering: Experimental and Computational Approach, PI, ARL, and Army Research Laboratory, 3/2017 (not invited)

Investigation of Radiation Effect in Supercapacitors for Space Application: Experimental and Theoretical Approach, PI, NRL BAA #68-17-02, 6/17 (not invited)

Novel synthesis and theoretical study of Magnetic Refrigerant Material, PI, US-Army research office, 4/2017, Pending decision

Template-free, etch-free aerosol nanopatterning, Co-PI, ARL BAA Announcement #W911NF-17-S-0003, (not invited)

Research

The PDA period allowed me to add a new focus to my research work; Energy Materials. During the PDA, I have actively worked in the field of novel nanostructured supercapacitor materials and developed a strong collaboration with Dr. Ram Gupta from Pittsburg State University, Pittsburg, KS. The PDA also allowed me to finish a couple of manuscripts pertaining to our work in the field of magnetic materials. Following is the list of publications resulted from my work during PDA;

Publication List:

Energy Materials

1. Orange peel derived carbon: Architecting sustainable and high-performance supercapacitor electrodes, C Ranaweera, P Kahol, M Ghimire, S Mishra, Ram Gupta, Carbon, 2017, 3(3), 25; doi:10.3390/c3030025
2. Highly flame-retardant bio-based polyurethanes using novel reactive bromine polyols, Authors: Bhoyate, S; Ionescu, Mihail; Radojicic, Dragana ; Kahol, Pawan; Chen, Jiyang ; Mishra, Sanjay; Gupta, Ram, ACS Sustainable Chemistry & Engineering, Submitted July 2017
3. 2H/1T co-phased MoS₂ decorated on carbon nanofibers for highly efficient and durable electrocatalyst for hydrogen evolution reaction, Zhang, C; Wang, Z; Bhoyate, S; Vasiraju, V; Gupta, Gautam; Palchoudhury, Soubantika; Kahol, Pawan; Mishra, Sanjay; Perez, Felio; Gupta, Ram, ACS Catalysis, Submitted 2017
4. Eco-friendly and High-Performance Supercapacitors for Elevated Temperature Applications using Recycled Tea Leaves, Global Challenges, Accepted Aug 2017
5. Surface engineered flexible carbon nanofibers for durable metal free electrocatalyst for oxygen evolution reaction and high-performance Li-ion supercapacitors, Submitted to Energy and Environmental Science, June 2017
6. Synthesis and Characterization of Carbon Nanospheres, Priya Karna, Madhav Ghimire, Sanjay Mishra, Sunil Karna, Open Access Library Journal, 4, e3619 (2017).
7. Facile Hydrothermal Synthesis of hollow Fe₃O₄ nanospheres: Effect of Hydrolyzing agents and Electrolytes on electrocapacitive performance of advanced electrodes, H. Adhikari, D. Kunwar, M. Ghimire, C. Ranaweera, R. Gupta, J. Alam, and S. R. Mishra, Accepted, International Journal of Metallurgy and Metal Physics, 2017
8. Nanostructured cobalt oxide and cobalt sulfide for flexible, high performance and durable supercapacitors, S. Aloqayli, C. K. Ranaweera, Z. Wang, K. Siam, P. K. Kahol, P. Tripathi, O.N. Srivastava, Bipin Kumar Gupta, S.R. Mishra, Felio Perez, X. Shen, Ram K. Gupta, Energy Storage Materials, 8, 68 (2017)
9. Flower-shaped cobalt oxide nano-structure as an efficient, flexible and stable electrocatalyst for oxygen evolution reaction, Materials Chemistry Frontiers, 1, 1580 (2017).
10. Synthesis and electrochemical performance of hydrothermally synthesized Co₃O₄ nanostructured particles in presence of Urea, H. Adhikari, M. Ghimire, R. Gupta, J. Chandler, and S. R. Mishra, Journal of Alloys and Compounds, 708. 638 (2017).
11. Template-free synthesis of hierarchical mixed-metal cobaltites: Electrocapacitive and Theoretical study, Hitesh Adhikari, Dipesh Neupane, C.K. Ranaweera, John Candler, Ram K. Gupta, Santosh Sapkota, Xiao Shen, Sanjay R. Mishra, Electrochimica Acta, 225, 514 (2017)

Magnetic Materials

12. Synthesis and characterization of co-Doped SrFe_{12-x}(DyAl)_xO₁₉ Hexaferrite, D. Neupane, L. Wang, H. Adhikari, J. Alam, and S. R. Mishra, Journal of Alloys and Compounds, 701, 138 (2017).
13. Synthesis and Magnetic study of magnetically hard-soft SrFe_{12-y}Al_yO₁₉ - x Wt.% Ni_{0.5}Zn_{0.5}Fe₂O₄ nanocomposites, D. Neupane, M. Ghimire, H. Adhikari, L. Wang, J.

Alam, and S. R. Mishra, AIP Advances 7, 055602 (2017); doi: <http://dx.doi.org/10.1063/1.4978398>

14. Structural and magnetic properties of Co^{2+} - W^{4+} ions doped M-type Ba-Sr hexaferrite synthesized by a ceramic method, Rajat Joshia, Charanjeet Singh, Dalveer Kaur, Hesham Zakid, S. Bindra Narang, Rajshree Jotania, Sanjay Mishra, Jasbir Singh, Preksha Dhruv, Madhav Ghimiree Journal of Alloys and Compounds, **695**, 909 (2017).
15. Elucidation of phase evolution, microstructural, Mössbauer and magnetic properties of Co^{2+} - Al^{3+} doped M-type Ba-Sr hexaferrites synthesized by a ceramic method, Jasbir Singha, Charanjeet Singh, Dalveer Kaurd, Hesham Zakie, I. A Abdel-Latif, S. Bindra Narang, Rajshree Jotaniai, Sanjay Mishra, Rajat Joshib, Preksha Dhruv, Madhav Ghimire, Sagar E. Shirsath, S. S. Meenal, Journal of Alloys and Compounds, **695**, 1112 (2017)

Additional Activities:

1. Mentored an MS student towards completion of a Thesis.
2. Drafted an operating manual for Graduate Program in Physics
3. Initiated planning for Materials Day event to be hosted in Fall 2017