

Majid Beidaghi

Post Doctoral Research Associate

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Education

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| 2008-2012 | Florida International University (Miami, FL)
Ph.D. Materials Engineering |
| 2003-2006 | K. N. Toosi University of Technology (Tehran, Iran)
M.Sc. , Materials Science and Engineering |
| 1999-2003 | Isfahan University of Technology (Isfahan, Iran)
B.Sc. , Metallurgical and Materials Engineering |

Research and Work Experience

August 2012- Present- Post Doctoral Research Associate-Drexel University, Philadelphia, PA;
Supervisor: Prof. Yury Gogotsi

January 2008- August 2012- Doctoral Student- *Florida International University*, Miami, FL;
Supervisor : Prof. Chunlei Wang

- Design and fabrication of 3D carbon micro-structures through carbon-microelectromechanical systems (C-MEMS)
- Electrochemical activation of 3d C-MEMS structures for on-chip micro-supercapacitors
- Integration of CNT on C-MEMS structures for supercapacitor applications
- Electrochemical deposition of conduction polymers on C-MEMS structures for micro-supercapacitors
- Electrostatic Spray Deposition (ESD) of nanomaterials for supercapacitor and battery applications
- Development of micro-patterned structures of graphene and graphene/CNT hybrid films through combination photolithography and Electrostatic Spray Deposition (ESD) for supercapacitor applications
- Electrostatic spray deposition of graphene and manganese oxide composite electrodes for supercapacitor applications
- Electrostatic Spray deposition of graphene on 3D C-MEMS structures for electrochemical sensor application

September 2003- November 2007- Materials selection Expert- Materials Research Center-*SAPCO**,
Tehran, Iran.

- Investigation of Manufacturing Conditions of Powder Metallurgy Parts with Control of Microstructure and Mechanical Properties
- Mechanical Properties and Pore Structure of Warm Compaction Parts Compared to Other PM Manufacturing Processes

**SAPCO* -Supplying Automotive Parts Company 12 KM Karadj Rd, Tehran 1389911498 Iran

Expertise

- Extensive Cleanroom experience:
 - Mask design and fabrication
 - Standard photoresist processing and microfabrication (*Super-user of microfabrication facility at FIU*)
 - Wet and dry etching
 - Nanoimprint lithography
 - Experience with e-beam lithography
 - Optical and electronic microscopy; profilometry; ellipsometry,
- Wide experience in Electrostatic Spray Deposition (ESD)
- Extensive knowledge of electrochemical techniques (Such as Cyclic Voltammetry, Chronopotentiometry and Electrochemical Impedance Spectroscopy)
- Electrochemical deposition of conductive polymers and metal oxides.
- Well versed in the use of potentiostats and glove boxes.
- Wide experience in materials analysis and characterization techniques, including SEM (*super-user of JEOL 7000 FE-SEM at FIU*), XRD, EDS, FTIR, and Raman spectroscopy.

Honors and Awards

08/2012	Worlds Ahead Graduate Award Florida International University
09/2011	Dissertation year Fellowship (DYF) Florida International University
09/2010	Doctoral Evidence Acquisition (DEA) Fellowship Florida International University

Publications

- ❖ **Majid Beidaghi** and Chunlei Wang, “Micro-supercapacitors Based on Interdigital Electrodes of Reduced Graphene Oxide and Carbon Nanotube Composites with Ultra-high Power Handling Performance” *Advance Functional Materials*, Early View Article, 2012, DOI: 10.1002/adfm.201201292.
- ❖ **Majid Beidaghi**, Zhifeng Wang, Lin Gu, Chunlei Wang, “Electrostatic spray deposition of graphene nanoplatelets for high-power thin-film supercapacitor electrodes”, *Journal of Solid State Electrochemistry*, Online First Article, 2012, DOI: 10.1007/s10008-012-1777-5.
- ❖ Varun Penmatsa, A Rahim Ruslinda, **Majid Beidaghi**, Hiroshi Kawarada, Chunlei Wang, *Biosensors and Bioelectronics*, 2012, In Press, <http://dx.doi.org/10.1016/j.bios.2012.06.055>
- ❖ Varun Penmatsa, Taekwon Kim, **Majid Beidaghi**, Hiroshi Kawarada, Zhifeng Wang, Lin Gu, Chunlei Wang “Three-Dimensional Graphene Nanosheets Encrusted Carbon Micropillar Arrays for Electrochemical Sensing”, *Nanoscale*, 2012,4, 3673-3678.
- ❖ **Majid Beidaghi**, Chunlei Wang, “Micro-supercapacitors based on three dimensional interdigital polypyrrole/C-MEMS electrodes”, *Electrochimica Acta*, 56 (2011) 9508-9514
- ❖ **Majid Beidaghi**, Wei Chen, Chunlei Wang, “Electrochemically Activated 3D C-MEMS Based Supercapacitors”, *Journal of Power Sources* 196 (2011) 2403-2409.
- ❖ Wei Chen, **Majid Beidaghi**, Varun Penmatsa, Latha Kumari, Wenzhi Li, and Chunlei Wang , “Integration of Carbon Nanotubes to C-MEMS for On-chip Supercapacitors” , *IEEE Transactions On Nanotechnology* 9 (2010) 734-740.
- ❖ **Majid Beidaghi**, Chunlei Wang, “Recent advances in design and fabrication of on-chip microsupercapacitors”, *Proceedings of SPIE Conference on Energy Harvesting and Storage: Materials, Devices, and Applications III*, April 23 – 27, 2012, Baltimore, MD

- ❖ **Majid Beidaghi**, Chunlei Wang, “Design, fabrication, and evaluation of on-chip micro-supercapacitors”, Proceeding of SPIE Symposium on Defense, Security, and Sensing, April 25-29, 2011, Orlando,FL
- ❖ **Majid Beidaghi**, Chunlei Wang, “On-chip micro-power: Three dimensional structures for micro-batteries and micro-supercapacitors”, Proceeding of SPIE Symposium on Defense, Security, and Sensing, April 5-9, 2010, Orlando,FL

Selected Presentations

- ❖ **Majid Beidaghi**, Chunlei Wang, “Micro-Supercapacitors of Hybrid Graphene/CNT Electrodes.” (oral presentation), 2011 MRS Fall meeting, November 28 - December 2, 2011, Boston, MA
- ❖ **Majid Beidaghi**, Chunlei Wang, “Hybrid Graphene-Carbon Nanotube Films as Supercapacitor Electrodes”, (oral presentation), 220th ECS meeting, October 9-14, 2011, Boston, MA.
- ❖ **Majid Beidaghi**, Chunlei Wang, “Electrochemical performance of manganese oxide/graphene composite electrodes prepared by electrostatic spray deposition”, (oral presentation), 219th ECS meeting, May 1-6, 2011, Montreal, Canada.
- ❖ **Majid Beidaghi**, Chunlei Wang, “Binder-free Porous Network of Graphene/Manganese Oxide Composites as Electrodes for Electrochemical Capacitors” (oral presentation), 2011 MRS Spring meeting, April 25-29, 2011, San Francisco, CA.
- ❖ **Majid Beidaghi**, Chunlei Wang, “C-MEMS/Manganese Oxide Composites as Electrodes for Microsupercapacitors” (oral presentation), 2011 MRS Spring meeting, April 25-29, 2011, San Francisco, CA.
- ❖ **Majid Beidaghi**, Chunlei Wang, “ C-MEMS Structures as Three Dimensional Current Collectors for Micro supercapacitors“ (oral presentation), 2010 MRS Fall meeting, November 29 - December 3, 2010 Boston, Massachusetts
- ❖ **Majid Beidaghi**, Chunlei Wang, “ Preparation and electrochemical characterization of polypyrrole-based three dimensional micro-supercapacitors“ (oral presentation), 218th ECS meeting, October 10-15, 2010, Las Vegas, NV.
- ❖ Wei Chen, **Majid Beidaghi**, Whenzhi Li, Chunlei Wang, “Direct growth of Carbon Nanotubes on C-MEMS platform as electrode materials for On-chip Supercapacitors” (oral presentation), 2010 MRS Spring meeting, April 6-8, 2010, San Francisco, CA.
- ❖ **Majid Beidaghi**, Wei Chen, Chunlei Wang “Electrochemically Activated C-MEMS Structures as Microelectrodes for On-Chip Supercapacitors” (oral presentation), 2010 MRS Spring meeting, April 6-8, 2010, San Francisco, CA.
- ❖ Wei Chen, Kevin Bechtold, **Majid Beidaghi**, Varun Penmatsa, Chunlei Wang, “Carbon Nanotube-confined MnO₂ Nanocomposites for Electrochemical Capacitors” (poster) DARPA LOTS workshop, Dec 4, 2009, Boston, MA
- ❖ **Majid Beidaghi**, Wei Chen, Chunlei Wang, “Three Dimensional Microsupercapacitors: As-Pyrolyzed and Porous Carbon Structures” (poster), 2009 MRS fall meeting, Nov 30-Dec 4, 2009, Boston, MA.
- ❖ Wei Chen, Kevin Bechtold, **Majid Beidaghi**, Varun Penmatsa, Chunlei Wang, “Carbon Nanotube-confined MnO₂ Nanocomposites for Electrochemical Capacitors” (poster), 2009 MRS fall meeting, Nov 30-Dec 4, 2009, Boston, MA.
- ❖ Chunlei Wang, Wei Chen, **Majid Beidaghi**, Kevin Bechtold, Yan Yu, “Fabrication of Nano Fractal Electrodes for on-Chip Supercapacitors” (poster) , DARPA PI meeting, Washington DC, Oct 27-28, 2009
- ❖ **Majid Beidaghi**, Wei Chen, C. Wang , “3D Microsupercapacitor Based on C-MEMS with Improved Electrode Design” (oral presentation), Nano-DDS 2009, Sept 28-Oct 2, 2009, Ft Lauderdale, Florida

- ❖ Wei Chen, Chunlei Wang, Kevin Bechtold, **Majid Beidaghi**, Varun Penmatsa, “Carbon Nanotube-confined MnO₂ Nanocomposites for Electrochemical Capacitors” (oral presentation), Nano-DDS 2009, Sept 28-Oct 2, 2009, Ft Lauderdale, Florida
- ❖ Wei Chen, **Majid Beidaghi**, Chunlei Wang, “Carbon Nanotube-confined MnO₂/C-MEMS Nanostructures for On-chip Electrochemical Capacitors”, (poster) the 53rd International Conference on Electron, Ion, and Photon Beam Technology and Nanofabrication, May 26-29, 2009, Marco Island, FL
- ❖ **Majid Beidaghi**, Varun Penmatsa, Wei Chen, Chunlei Wang, “On-Chip Supercapacitors Based on Porous Carbon Electrodes”, (poster) 215th ECS Meeting, May 24-29, 2009, San Francisco, California
- ❖ **Majid Beidaghi**, Varun Penmatsa, Wei Chen, Chunlei Wang, “Characterization of Porous Electrodes for 3D Microsupercapacitors”, (oral presentation) 25th SBEC, May 15-17, 2009, Miami, FL
- ❖ Wei Chen, **Majid Beidaghi**, Chunlei Wang, “Integrated CNTs to C-MEMS for On-chip Supercapacitors” (poster) 2009 MRS Spring meeting, April 13-17, 2009, San Francisco, CA
- ❖ **Majid Beidaghi**, Varun Penmatsa, Wei Chen, Chunlei Wang, “3D Microsupercapacitor Based on C-MEMS with Porous Electrodes”, (poster) 2009 MRS Spring meeting, April 13-17, San Francisco, CA
- ❖ Yan Yu, **Majid Beidaghi**, Varun Penmatsa, Abirami Dhanabalan, Chunlei Wang, “Fabrication of Nano Fractal Electrodes for On-Chip Supercapacitors”, (oral/poster) DARPA MEMS PI Review Meeting, Vail, CO, July 23-25, 2008
- ❖ **Majid Beidaghi**, Varun Penmatsa, Yan Yu, Chunlei Wang, “3D Microsupercapacitor Based on C-MEMS with Improved Electrode Design” (poster) 2008 MRS Fall Meeting, Dec 1-5, 2008, Boston, MA
- ❖ Varun Penmatsa, Yan Yu, **Majid Beidaghi** and Chunlei Wang, “Enhancing Surface Porosity and Roughness on C-MEMS Based 3D Electrodes for Micro Biofuel Cells”, (poster) 2008 MRS Fall Meeting, Dec 1-5, 2008, Boston, MA