

Christine B. Hatter

4601 Chester Avenue, Apt BW • Philadelphia, PA 19143 • 856-397-0572

Cbh52@drexel.edu

EDUCATION

- 09.2015 - Anticipated graduation
06.2020 **Drexel University**, Philadelphia PA
Ph.D. Candidate, Materials Science and Engineering
Advisor: Professor Yury Gogotsi
Thesis: Synthesis and characterization of multifunctional epoxy-matrix nanocomposites with transition metal carbides/carbonitrides (MXenes)
- 06.2018 **Drexel University**, Philadelphia, PA
M.S., Materials Science and Engineering
- 05.2014 **Rutgers, The State University of New Jersey**, Camden, NJ
B.S., Physics

RESEARCH EXPERIENCE

- 2015 – Present **Drexel University, Philadelphia, PA**
Materials Science and Engineering Department
- Bottom-up synthesis of multifunctional epoxy nanocomposites using two-dimensional transition metal carbide (MXene) fillers and study of mechanical and electrical properties.
 - Study optimization of MXene-polymer interfaces using MXene surface functionalization techniques.
 - Development and study of damage sensing glass fiber-reinforced epoxy composites using MXenes.
- 2016 – 2018 **KAIST / KIST, Daejeon and Seoul, S. Korea**
Visiting summer researcher
- Development of nano-fabrication and analysis of MXene and MXene-polymer composites.
 - Study processing mechanism of MXene-epoxy nanocomposites.
- 2015 – 2015 **Westward Pharmaceutical, Cherry Hill, NJ**
Investigation Scientist, Quality Assurance
- Investigation of product-related internal issues and customer complaints for pharmaceutical drugs manufactured on-site.
 - Provided critical investigation, analysis, and reporting for all levels of product manufacturing.
- 2014 – 2015 **Oak Ridge National Laboratory, Oak Ridge, TN**
DOE research intern, Chemical Sciences Division
- Development of thermoplastic composites with magnetically aligned rare-earth powders for 3D printed bonded magnets.
 - Study the mechanism of silver ion mobility in conductive glasses using SPM and electrochemical strain microscopy.
- 2014 – 2014 **GKN: Hoeganaes, Inc., Cinnaminson NJ**
R&D Laboratory Technician, Quality Assurance
- Investigation of product-related customer complaints for ferrous powder premixes manufactured on-site.
 - Provided mechanical analysis of compacted and sintered powder premixes for reporting to customer.
- 2012 – 2014 **Rutgers University, Camden, NJ**
Physics Department
- Synthesis of magnetic nanoparticles in colloidal solution with different diameters and core-shell structures via laser ablation.
 - Study of laser ablation mechanism of bulk metals in air and liquid environments.

SKILLS

Technical: Wet chemistry techniques, TEM/STEM/EDX, FTIR spectroscopy, TGA, Dynamic mechanical analysis, Differential scanning calorimetry, UV-Visible spectroscopy, Tensile/compression testing, Nanoindentation, Vickers hardness analysis, SEM, Dynamic light scattering, AFM/MFM, Polarized light microscopy; **Sample preparation:** Ultramicrotomy, grinding/polishing, twin-screw extruder, pellet press, industrial machine press; **Software:** Microsoft Office, Origin Pro, ImageJ, Endnote, Crystal Maker, ChemSketch

HONORS AND AWARDS

- 2019 U.S. Department of Education GAANN Fellowship
- 2018 American Chemical Society (ACS) Student Exchange Award
- 2018 Drexel International Travel Award (S. Korea)
- 2017 George Hill Jr. Endowed Fellowship
- 2017 DOD SMART Fellowship Finalist
- 2016 NANOKOREA 2016 Symposium Best Poster Award
- 2015 Drexel University Graduate College Doctoral Fellowship

PATENTS

1. Y. Gogotsi, B. Anasori, M. Alhabeb, **C. B. Hatter**, C. M. Koo, F. Shahzad, “Two-dimensional metal carbide, nitride, and carbonitride films and composites for EMI shielding”. US Patent Application 16/092338, Filed: April 4, 2017
2. Y. Soda, T. Torita, Y. Gogotsi, B. Anasori, **C. B. Hatter**, “Aligned film and method for producing the same”. US Patent Application 16/140703, Filed: September 25, 2018

PUBLICATIONS

1. M. Han, X. Yin, K. Hantanasirisakul, X. Li, A. Iqbal, **C. B. Hatter**, A. Anasori, C. M. Koo, L. Zhang, L. Cheng, Y. Gogotsi, “Anisotropic, Compressible and Lightweight MXene Aerogels for Electromagnetic Interference Shielding”, *Advanced Optical Materials* 7.10, 1900267 (2019).
2. X. Wang, T. Mathis, K. Li, Z. Lin, L. Vlcek, T. Torita, N. Osti, **C. B. Hatter**, P. Urbankowski, A. Sarycheva, M. Tyagi, E. Mamontov, P. Simon, Y. Gogotsi, “Influences from Solvents on Charge Storage in Titanium Carbide MXenes”, *Nature Energy* 4.3, 241 (2019).
3. A. Levitt, M. Alhabeb, **C. B. Hatter**, A. Sarycheva, G. Dion, Y. Gogotsi, “Electrospun MXene/carbon Nanofibers as Supercapacitor Electrodes”, *Journal of Materials Chemistry A* 7.1, 269-277 (2019).
4. A. L. Bennett-Jackson, M. Falmbigl, K. Hantanasirisakul, Z. Gu, D. Imbrenda, A. V. Plokhikh, A. Will-Cole, **C. B. Hatter**, B. Anasori, Y. Gogotsi, J. E. Spanier, “Van der Waals Epitaxy of Highly (11)-Oriented BaTiO₃ on MXene”, *Nanoscale* 11.2, 622-630 (2019).
5. M. Vural, A. Pena-Francesch, J. Bars-Pomes, H. Jung, H. Gudapati, **C. B. Hatter**, B. D. Allen, B. Anasori, I. T. Ozbolat, Y. Gogotsi, M. C. Demirel, “Inkjet Printing of Self-Assembled 2D Titanium Carbide and Protein Electrodes for Stimuli-Responsive Electromagnetic Shielding”, *Advanced Functional Materials* 28.32, 1801972 (2018).
6. M. Alhabeb, K. Maleski, T. Mathis, A. Sarycheva, **C. B. Hatter**, S. Uzun, A. Levitt, Y. Gogotsi, “Selective Etching of Silicon from Ti₃SiC₂ (MAX) Produces 2D Titanium Carbide (MXene)”, *Angewandte Chemie* 130.19, 5542-5546 (2018).
7. A. Byeon, **C. B. Hatter**, J. H. Park, C.W. Ahn, Y. Gogotsi, J. W. Lee, “Molybdenum oxide/carbon composites derived from the CO₂ oxidation of Mo₂CT_x (MXene) for lithium ion battery anodes”, *Electrochimica Acta* 258, 979-987 (2017).
8. J. Yan, C. E. Ren, K. Maleski, **C. B. Hatter**, B. Anasori, P. Urbankowski, A. Sarycheva, Y. Gogotsi, “Flexible MXene/Graphene Films for Ultrafast Supercapacitors with Outstanding Volumetric Capacitance”, *Advanced Functional Material* 27.30, 1701264 (2017).
9. F. Shahzad*, M. Alhabeb*, **C. B. Hatter***, B. Anasori, S. M. Hong, C. M. Koo, Y. Gogotsi, “Electromagnetic Interference Shielding with 2D Transition Metal Carbides (MXenes)”, *Science* 353.6304, 1137-1140 (2016). (***equal contribution**)

10. I. C. Nlebedim, H. Ucar, **C. B. Hatter**, M. J. Kramer, R. W. McCallum, S. K. McCall, M. P. Paranthaman, “Studies on In-situ Magnetic Alignment of Bonded Anisotropic Nd-Fe-B Alloy Powders”, *Journal of Magnetism and Magnetic Materials*, 422, 168-173 (2016).

SUBMITTED AND IN PREPARATION:

11. **C. B. Hatter**, J. Shah, B. Anasori, Y. Gogotsi, “Micromechanical Response of Two-dimensional Transition Metal Carbonitride (MXene) Reinforced Epoxy Composites”, *Composites Part B: Engineering* (2019) *submitted*
12. **C. B. Hatter**, A. Levitt, T. Mathis, A. Sarycheva, B. Anasori, L. Nataraj, Y. Sliozberg, A. Hall, Y. Gogotsi, “Electrically Conductive MXene-coated Glass Fibers for Damage-sensing Epoxy Composite Applications”, *in preparation*

SELECTED PRESENTATIONS

1. **C. B. Hatter**, B. Anasori, Y. Gogotsi, “Functionalized transition metal carbides (MXenes) for improved interface and mechanical properties of polymer nanocomposites”, **ACS Spring 2019**, Orlando, FL (talk)
2. **C. B. Hatter**, “2D Transition Metal Carbides (MXene) Fillers for Multifunctional Polymer Composites”, **Drexel Materials/Arkema Research Symposium 2019**, Philadelphia, PA (talk)
3. **C. B. Hatter**, J. Shah, B. Anasori, S. K. Yadav, G. R. Palmese, Y. Gogotsi, “2D Transition Metal Carbide/Carbonitride (MXene) Fillers for Structural Reinforcements in Polymer Nanocomposites”, **IUMRS-ICEM 2018**, Daejeon, S. Korea (poster)
4. **C. B. Hatter**, F. Shahzad, J. Shah, S. K. Yadav, B. Anasori, S. M. Hong, G. R. Palmese, Y. Gogotsi, “2D Transition Metal Carbide/Nitride (MXene) Fillers as Structural Reinforcers in Polymer Nanocomposites”, **MRS Fall 2017**, Boston, MA (poster)
5. **C. B. Hatter**, F. Shahzad, M. Alhabeb, J. Shah, S. K. Yadav, B. Anasori, S. M. Hong, G. R. Palmese, C.M. Koo, Y. Gogotsi, “Polymer Nanocomposites with 2D Transition Metal Carbide (MXene) Fillers for Advanced Electromagnetic Interference Shielding”, **NOBCCHE Fall 2017**, Minneapolis, MN (poster)
6. **C. B. Hatter**, F. Shahzad, M. Alhabeb, J. Shah, S. K. Yadav, B. Anasori, S. M. Hong, G. R. Palmese, C. M. Koo, Y. Gogotsi, “2D Transition Metal Carbide/Nitride (MXene) Fillers for Enhanced Electromagnetic Interference Shielding and Mechanical Properties of Nanocomposites”, **NANOKOREA 2017**, Ilsan, S. Korea (poster)
7. **C. B. Hatter**, M. Alhabeb, F. Shahzad, B. Anasori, S. M. Hong, C.M. Koo, Y. Gogotsi, “Conductive 2D Transition Metal Carbide (MXene) Polymer Composites for Electromagnetic Interference Shielding Applications”, **MRS Fall 2016**, Boston, MA (talk)
8. **C. B. Hatter**, M. Alhabeb, F. Shahzad, B. Anasori, S. M. Hong, C.M. Koo, Y. Gogotsi, “Polymer Composites with 2D Transition Metal Carbide (MXene) Fillers for Advanced Electromagnetic Interference Shielding”, **MRS Fall 2016**, Boston, MA (poster)
9. **C. B. Hatter**, Y. Gogotsi, “Electromagnetic Interference (EMI) Shielding with 2D Transition Metal Carbides”, **Singh Nano Week 2016**, Philadelphia, PA (talk)
10. **C. B. Hatter**, B. Anasori, Y. Gogotsi, “Two-Dimensional Transition Metal Carbide (MXenes) Reinforcement of Polymer Matrices for Enhanced Multifunctional Composites”, **NANOKOREA 2016**, Ilsan, S. Korea (**Best Poster Award**)
11. **C. B. Hatter**, M. P. Paranthaman, “Novel Magnetic Powder-Polymer Composite for High Performance Bonded Magnets in Clean Energy”, **Science Undergraduate Laboratory Internship 2014**, Oak Ridge, TN (poster)
12. **C. B. Hatter**, D. M. Bubb, “Synthesis of Magnetic Nanoparticles for Biomedical Applications”, **Celebration of Undergraduate Research & Creative Activity 2014**, Camden, NJ (poster)
13. J. Tomko, **C. B. Hatter**, J.J. Naddeo, M. Ratti, S. O’Malley, D. M. Bubb, “Ablation Threshold of Various Metals in Different Mediums”, **Celebration of Undergraduate Research & Creative Activity 2014**, Camden, NJ (poster)
14. **C. B. Hatter**, D. M. Bubb, “Synthesis and Application of Magnetic Nanoparticles as Contrast Agents”, **New Jersey Space Grant Consortium Symposium 2013**, New Brunswick, NJ (poster)

PROFESSIONAL SERVICES AND OUTREACH

STEM Outreach

- 2019 Led TEM and liquid nitrogen demonstrations during Drexel's Materials Camp
- 2018 Led TEM demonstrations during Drexel's Materials for Emerging Technology Camp
- 2018 Organized STEM Career Fair at Drexel for local HS students interested in STEM fields
- 2017 Led TEM demonstrations during Drexel's Materials for Emerging Technology Camp
- 2017 Participated as a judge in the undergraduate poster session for the annual AMP Research Symposium
- 2017 Led ferrofluid and magnetism demonstrations during Drexel's ASM Materials Camp
- 2016 Assisted with materials fatigue demonstrations during Drexel's ASM Materials Camp

Professional Society Member

Alpha Sigma Mu Materials Engineering Honor Society (2017, 2018, 2019), Materials Engineering Graduate Student Network (Vice President 2017, Treasurer 2016), Drexel Black Graduate Student Union (Vice President of Outreach 2018, Secretary 2017), Drexel Graduate Women in Science and Engineering (2015)

REFERENCES

Available upon request.