

Kanit Hantanasirisakul

Email address: kh654@drexel.edu

Research Interests

- Electronic and magnetic properties of 2D materials
- Materials for energy storage devices, i.e., Li-ion and other types of battery, supercapacitors
- Photo- and electrocatalysts for fuel production

Education

2016 - present

PhD candidate Department of Materials Science and Engineering
Drexel University, Philadelphia, USA (GPA: 4.00/4.00)
Research Area: Electronic and magnetic properties of 2D transition metal carbides and nitrides (MXenes)
Advisor: Prof. Yury Gogotsi ; Co-advisor: Prof. Steven J. May

2013 -2015

European Master's Course “Materials for Energy Storage and Conversion (MESC)”. First rank in class with average score 17.1/20

The MESC Master Course is a 2-year (120 ECTS) program in Materials Science and Electrochemistry, within 7 Universities in 3 European countries, China and USA. The course consists of three semesters of classes taught entirely in English plus one semester for a Master thesis in a research laboratory in partner universities.

- Semester 1: University Toulouse III - Paul Sabatier, Toulouse, France
- Semester 2: Warsaw University of Technology, Warsaw, Poland
- Semester 3: University of Cordoba, Cordoba, Spain
- Semester 4: Master thesis at Drexel University, Philadelphia, USA
“Electrochemical Tuning of Optical Properties of Two-dimensional Metal Carbides” Department of Materials Science and Engineering,
Thesis advisors: Prof. Yury Gogotsi and Prof. Michel Barsoum

2008 - 2012

Mahidol University, Bangkok, Thailand
Bachelor of Science (Chemistry) in Distinction Program (1st class honors)
GPA: 3.66/4.00
Undergraduate Thesis: Mg(BH₄)₂ nano-confined in HKUST-1 for Hydrogen Storage Application” Center for Alternative Energy (CAE) Laboratory, Faculty of Science Mahidol University, Bangkok, Thailand
Thesis advisor: Asst. Prof. Pasit Pakawatpanurut

Publications

18. H. Riazi, M. Anayee, K. Hantanasirisakul, A. A. Shamsabadi, B. Anasori, Y. Gogotsi, M. Soroush. *Adv. Mater. Interfaces.*, **2020**, 1902008
17. Y. Yang, K. Hantanasirisakul, N. Frey, B. Anasori, R. Green, P. Rogge, I. Waluyo, A. Hunt, P.

- Shafer, E. Arenholz, V. B. Shenoy, Y. Gogotsi, S. J. May. Distinguishing Electronic Contributions of Surface and Sub-surface Transition Metal Atoms in Ti-based MXenes. *2D Mater.*, **2020**, *7*, 025015
16. L. Agartan, K. Hantanasirisakul, S. Buczek, B. Akuzum, K. A. Mahmoud, B. Anasori, Y. Gogotsi, and E. C. Kumbur. Influence of Operating Conditions on the Desalination Performance of a Symmetric Pre-conditioned $Ti_3C_2T_x$ -MXene Membrane Capacitive Deionization System. *Desalination*, **2020**, *477*, 114267
15. G. Deysheer, C. E. Shuck, K. Hantanasirisakul, N. C. Frey, A. C. Foucher, K. Maleski, A. Sarycheva, V. B. Shenoy, E. A. Stach, B. Anasori and Y. Gogotsi. Synthesis of Mo_4VAIC_4 MAX Phase and Two-Dimensional Mo_4VC_4 MXene with Five Atomic Layers of Transition Metals. *ACS Nano*, **2020**, *1*, 204
14. S. J. Kim, J. Choi, K. Maleski, K. Hantanasirisakul, H-T. Jung, Y. Gogotsi, and C W. Ahn. Interfacial Assembly of Ultrathin, Functional MXene Films. *ACS Appl. Mater. Interfaces*, **2019**, *35*, 32320
13. C. E. Shuck, M. Han, K. Maleski, K. Hantanasirisakul, S. J. Kim, J. Choi, W. E. B. Reil, and Y. Gogotsi. Effect of Ti_3AlC_2 MAX Phase on Structure and Properties of Resultant $Ti_3C_2T_x$ MXene. *ACS. Appl. Nano. Mater.*, **2019**, *6*, 3368
12. T. Schultz, N. C. Frey, K. Hantanasirisakul, S. Park, S. J. May, V. B. Shenoy, Y. Gogotsi, and N. Koch. Surface Termination Dependent Work Function and Electronic Properties of $Ti_3C_2T_x$ MXene *Chem. Mater.*, **2019**, *17*, 6590
11. Kanit Hantanasirisakul, M. Alhabeab, A. Lipatov, K. Maleski, B. Anasori, P. Salles, C. Ieosakulrat, P. Pakawatpanurut, A. Sinitiskii, S. J. May, and Y. Gogotsi. Effects of Synthesis and Processing on Optoelectronic Properties of Titanium Carbonitrides MXene. *Chem. Mater.*, **2019**, *31*, 2941
10. M. Han, X. Yin, K. Hantanasirisakul, X. Li, A. Iqbal, C. B. Hatter, B. Anasori, C. M. Koo, T. Torita, Y. Soda, L. Zhang, L. Cheng, and Y. Gogotsi. Anisotropic MXene Aerogels with a Mechanically Tunable Ratio of Electromagnetic Wave Reflection to Absorption. *Adv. Optical Mater.*, **2019**, 1900267
9. X. Xiao, P. Urbankowski, K. Hantanasirisakul, Y. Yang, S. Sasaki, L. Yang, C. Chen, H. Wang, L. Miao, S. H. Tolbert, S. J. L. Billinge, H. D. Abruña, S. J. May, and Y. Gogotsi. Scalable Synthesis of Ultrathin Mn_3N_2 Exhibiting Room-Temperature Antiferromagnetism. *Adv. Funct. Mater.*, **2019**, 1809001
8. P. Salles, D. Pinto, K. Hantanasirisakul, K. Maleski, C. E. Shuck, and Y. Gogotsi. Electrochromic Effect in Titanium Carbide MXene Thin Films Produced by Dip-Coating. *Adv. Funct. Mater.*, **2019**, 1809223
7. L. Yang, Y. Dall'Agnese, K. Hantanasirisakul, C. E. Shuck, K. Maleski, M. Alhabeab, G. Chen, Y. Gao, Y. Sanehira, A. K. Jena, L. Shen, C. Dall'Agnese, X.-F. Wang, Y. Gogotsi, and T. Miyasaka. SnO_2 - Ti_3C_2 MXene Electron Transport Layer for Perovskite Solar Cells. *J. Mater. Chem. A* **2019**, *7*, 5635
6. A. L. Bennett-Jackson, M. Falmbigl, K. Hantanasirisakul, Z. Gu, D. Imbrenda, A. V. Plokhikh, A. Will-Cole, C. Hatter, L. Wu, B. Anasori, Y. Gogotsi, and J. E. Spanier. Van der Waals Epitaxy of Highly (111)-oriented $BaTiO_3$ on MXene. *Nanoscale*, **2019**, *11*, 622
5. J. L. Hart, K. Hantanasirisakul, A. C. Lang, B. Anasori, D. Pinto, Y. Pivak, J. T. van Omme, S. J. May, Y. Gogotsi, and M. L. Taheri. Control of MXenes' Electronic Properties Through Termination and Intercalation. *Nat. Commun.*, **2019**, *10*, 522

4. K. Hantanasirisakul and Y. Gogotsi. Electronic and Optical Properties of Two-Dimensional Transition Metal Carbides and Nitrides (MXenes). *Adv. Mater.*, **2018**, 52, 1804779
3. A. Ali, K. Hantanasirisakul, A. Abdala, P. Urbankowski, M.-Q. Zhao, B. Anasori, Y. Gogotsi, B. Aïssa, and K. A. Mahmoud. Effect of Synthesis on Performance of MXene/Iron Oxide Anode Material for Lithium-Ion Batteries. *Langmuir*, **2018**, 34, 11325
2. P. Urbankowski, B. Anasori, K. Hantanasirisakul, L. Yang, L. Zhang, B. Haines, S. J. May, S. J. L. Billinge, and Y. Gogotsi. 2D Molybdenum and Vanadium Nitrides Synthesized by Ammoniation of 2D Transition Metal Carbides (MXenes). *Nanoscale*, **2017**, 9, 17722
1. K. Hantanasirisakul, M.-Q. Zhao, P. Urbankowski, J. Halim, B. Anasori, S. Kota, C. E. Ren, M. W. Barsoum, and Y. Gogotsi. Fabrication of $Ti_3C_2T_x$ MXene Transparent Thin Films with Tunable Optoelectronic Properties. *Adv. Electron. Mater.*, **2016**, 2, 201600050

Scholarly Presentations

- | | |
|------|--|
| 2019 | <p>Poster Presentation titled “On the Electronic Properties of 2D Transition Metal Carbides and Nitrides (MXenes)”
2019 Materials Research Society (MRS) Spring Meeting, Phoenix, AZ</p> <p>Oral Presentation titled “Optoelectronic Application of 2D Transition Metal Carbides (MXenes)”
Nano Korea 2019, KINTEX, South Korea</p> <p>Oral Presentation titled “MXenes – 2D Materials Beyond Graphene”
The 2nd Materials Research Society of Thailand International Conference, Pattaya, Thailand (Best student oral presentation award)</p> |
| 2018 | <p>Oral Presentation titled “Effects of Synthesis and Processing on Optoelectronic Properties of Titanium Carbonitrides MXene”
2018 Materials Research Society (MRS) Spring Meeting, Phoenix, AZ</p> |
| 2017 | <p>Poster Presentation titled “Effects of Synthesis and Processing on Optoelectronic Properties of Titanium Carbonitrides MXene”
16th Graduate Student Poster Contest of the Liberty Bell Chapter of ASM International, Philadelphia</p> |
| 2012 | <p>Oral presentation and poster presentation titled “Nano-confined Magnesium Borohydride as a Hydrogen Storage Material”
6th Conference on Science and Technology for Youths, Bangkok, Thailand</p> |
| 2009 | <p>The Promotion of Academic Olympiads and Development of Science Education Foundation Science Camp, Bangkok, Thailand</p> |

Scholarship and Awards

- | | |
|------|---|
| 2019 | <p>PhD Internship,
National Nanofabrication Center, Korea Institute of Science and Technology (KAIST), Daejeon, South Korea</p> <p>First Place Winner Science as Art competition,</p> |
|------|---|

	Materials Research Society (MRS)
	Third Place Winner NanoArtography Image Competition
2018	Second Place Winner Science as Art competition, Materials Research Society (MRS)
2016 - 2018	Drexel University Graduate College Doctoral Fellowship Award
2013 - 2015	Erasmus Mundus Scholarship, MESOC Program
2008 - 2013	Sri Trang Thong Scholarship: a full scholarship provided by the Faculty of Science, Mahidol University, Bangkok, Thailand
2009	Selected as Thailand's representative in Asian Science Camp 2009, Tsukuba, Japan

Activities

2018 - present	Member, Materials Research Society (MRS)
	Reviewer and member, American Chemical Society (ACS)

Teaching Experience

2018-2019	Lab Instructor for MATE 280: Advanced Materials Laboratory Department of Materials Science and Engineering, Drexel University (20 undergraduate students). Responsible for TGA and XPS lab
2017	Recitation Instructor for ENGR 220: Fundamentals of Materials Department of Materials Science and Engineering, Drexel University (25 undergraduate students)
2016	Chemistry Teacher Mahidol University International Demonstration School, Nakhon Pathom, Thailand (130 students)
2016	Laboratory Assistant for ICCH 224 Integrated Laboratory Techniques in Chemistry I International College, Mahidol University, Nakhon Pathom, Thailand (30 undergraduate students)
2008 - 2010	Chemistry Lecturer for high school students in the Science Access Summer Program at the Faculty of Science, Mahidol University, Bangkok, Thailand (200 students)

Educational Outreach

2017, 2018	Organizing committee for the ASM International Materials Camp Department of Materials Science and Engineering, Drexel University
------------	---

2017 – 2018	High School Student Research Mentor Council Rock North High School Science Project
2017	Volunteer Philly Materials Science and Engineering Day
2015	Volunteer Electrochemical Society Student Chapter community outreach
2009 - 2012	Chemistry, Physics, and Mathematics Tutor for high school and university students

Skills

Laboratory

- Physical property measurement system (PPMS) for electronic and magnetic measurement
- X-ray photoelectron spectroscopy (XPS) and X-ray diffraction (XRD)
- Thermal analysis: TGA-DSC-MS
- Electron beam lithography and class 100 cleanroom operation.
- Microfabrication using focused ion beam scanning electron microscopy (FIB-SEM)
- Electrochemical characterization including voltammetry, electrochemical impedance spectroscopy (EIS), and chronopotentiometry
- Infrared, Raman, and UV-visible spectroscopy
- Atomic force microscopy (AFM)

Computer

OriginLab, Materials Studio, VESTA, ChemDraw, Gaussian 03, ArgusLab, Adobe Photoshop

Languages

English (fluent), Thai (native)