

Christopher J. Karwacki

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Professional Preparation

Drexel University, Materials Science, Ph.D., 2011
Drexel University, Chemistry, M.S., 1994
Loyola College, Chemistry Interdisciplinary, B.S., 1980

Professional Positions

2016	Senior Research Scientist (Factor 4), Chief Scientist Protection and Decontamination Division, Research & Technology Directorate, Edgewood Chemical Biological Center, U.S. Army, Aberdeen Proving Ground, Maryland
2011 - 2016	Chief Scientist, Division Chief Acting February-June 2013, Protection and Decontamination Division, Research & Technology Directorate, Edgewood Chemical Biological Center, U.S. Army, Aberdeen Proving Ground, Maryland
2011-2012	Army Science Board
1982-2011	Research Chemist, Edgewood Chemical Biological Center, U.S. Army, Aberdeen Proving Ground, Maryland
1980-1982	Chemist, W.R. Grace, Baltimore, Maryland

Professional Affiliations

American Chemical Society – Secretary Colloids and Surface Chemistry Division (2017)
American Vacuum Society
Materials Research Society

Leadership Positions

American Chemical Society

- Symposium Organizer (with J. Russell). “Surface Science and Catalysis”, 90th ACS Colloid and Surface Science Symposium, Harvard University, Cambridge MA, June 5-8, 2016.
- Symposium Organizer (with J. Russell and J. Morris), “Operando Spectroscopic Techniques to Understand the Structure-Activity Relationship of Catalytic Materials”, ACS 250th National Meeting, 2015.
- Department of Defense Consortium of Synchrotron Users for Advanced Functional Materials, 2016.
- Research Advisor to National Research Council (NRC) Post-Doctoral (PD) Program, Edgewood Chemical Biological Center, U.S. Army, Aberdeen Proving Ground, Maryland.
- Army Science Board, Secretary of Army, 2011-2012.

Research Interests and Focus

Dr. Christopher Karwacki is an active researcher in the basic and applied sciences for the design of porous materials involving chemical adsorption, reaction and sensing of hazardous chemicals. His research

specializes in the design of complex structures with emphasis on molecular based assembly of novel classes of porous substrates such as nanostructured metal oxides, metal organic frameworks, reduced metal clusters, amorphous and crystalline carbon. A particular aspect of Dr. Karwacki's research focuses on understanding the structure-activity relationship of catalyst materials and the development of design rules to improve their selectivity and efficiency under relevant operating conditions. Central to this work is acquiring detailed knowledge on interfacial phenomena, such as the role of surface structure and defects on binding, diffusion and reaction of adsorbates, product formation and how this information translates to the performance of bulk materials. In recent years Dr. Karwacki has been involved in establishing a surface science program for the Chemical Biological Defense Program that would enable scientists to gain insight into the molecular dynamics of DoD relevant materials under in situ and operando conditions. Dr. Karwacki is leading an effort to establish a DoD Consortium of Synchrotron Users with the Brookhaven National Laboratory and the Defense Threat Reduction Agency Chemical Biological Program (J9) and other DoD laboratories.

Selected Publications

Over 75 government (>50) and peer review (>25). h-index 11

Rajiv Wallace, Dimitrios A. Giannakoudakis, Marc Florent, Christopher J. Karwacki and Teresa Badosz, Ferrihydrite deposited on cotton textiles as protection media against the chemical warfare agent surrogate (2-chloroethyl ethyl sulfide), *J. Mater. Chem. A*, 2017, DOI: 10.1039/c6ta09548h

Bridewell, V. L.; Karwacki, C. J.; Kamat, P. V. Electrocatalytic Sensing with Reduced Graphene Oxide. Electron Shuttling between Redox Couples Anchored on a 2-D Surface, *ACS Sensors*, 2016, 1 (10), pp 1203–1207.

Joshua Abelard, Amanda R. Wilmsmeyer, Angela C. Edwards, Wesley O. Gordon, Erin M. Durke, Christopher J. Karwacki, Diego Troya, and John R. Morris, Adsorption of Substituted Benzene Derivatives on Silica: The Effects of Electron Withdrawing and Donating Groups, *J. Phy Chem. C.*, 2016, 120 (24), pp 13024–1303.

Rabeka Alam, Molly Labine, Christopher J. Karwacki, Prashant V. Kamat, Modulation of Cu₂-xS Nanocrystals through Reversible Photoinduced Electron Transfer, *ACS Nano* 2016, 10, 2880–2886.

Morris, J.R.; Russell, J.N.; Karwacki, C.J., An Operando View of the Nanoscale *J. Phys. Chem. Lett.* 2015, 6, 4923–4926.

Victoria L. Bridewell, Rabeka Alam, Christopher J. Karwacki, and Prashant V. Kamat, CdSe/CdS Nanorod Photocatalysts: Tuning the Interfacial Charge Transfer Process through Shell Length, *Chem. Mater.* 2015, 27, 5064–5071.

Abelard, Joshua, Wilmsmeyer, Amanda R.; Edwards, Angela C.; Gordon, Wesley O.; Durke, Erin M.; Karwacki, Christopher J.; Troya, Diego; Morris, John R., Adsorption of 2-Chloroethyl Ethyl Sulfide on Silica: Binding Mechanism and Energy of a Bifunctional Hydrogen-Bond Acceptor at the Gas-Surface Interface, *J. Phy Chem. C.* (2015), 119(1), 365-372.

Mogilevsky, Gregory; Hartman, Olga; Emmons, Erik D.; Balboa, Alex; DeCoste, Jared B.; Schindler, Bryan J.; Iordanov, Ivan; Karwacki, Christopher J., Bottom-up synthesis of anatase nanoparticles with graphene domains, *ACS Applied Materials & Interfaces* (2014), 6(13), 10638-10648.

Alam, Rabeka; Lightcap, Ian V.; Karwacki, Christopher J.; Kamat, Prashant V., Sense and Shoot: Simultaneous Detection and Degradation of Low-Level Contaminants Using Graphene-Based Smart Material Assembly, ACS Nano (2014), 8(7), 7272-7278

Christopher J. Karwacki, P. Ganesh, Paul R. C. Kent, Wesley O. Gordon, Gregory W. Peterson, Jun Jie Niu, and Yury Gogotsi, Structure-Activity Relationship of Au/ZrO₂ Catalyst on Formation of Hydroxyl Groups and Its Influence on CO Oxidation, J. Mater. Chem. A, (2013), 1(19), 6051-6062.