



## Chad D. Vecitis

W.M. Keck Laboratory M/C 138-78, California Institute of Technology  
Pasadena, CA, 91125; Phone: (626) 395-4427; [vecitis@caltech.edu](mailto:vecitis@caltech.edu)

### EDUCATION/PROFESSIONAL

**California Institute of Technology**, Pasadena, CA 2002-2008  
Ph.D. in Chemistry – Environmental Physical Chemistry  
“Sonochemical Destruction of Persistent Organic Pollutants”

**IGEN International**, Gaithersburg, MD 2001-2002  
Process and Development Associate

**Johns Hopkins University**, Baltimore, MD 1998-2001  
B.S. in Chemistry

### RESEARCH EXPERIENCE

**California Institute of Technology** (advisor: Michael R. Hoffmann) 2002 -2008

1. An ES-MS technique was developed to study reactions of gaseous oxidants with aquated inorganics; interfacial anion partitioning and ozone chemistry at the air-water interface were investigated.

2. A solar-powered electrochemical system was developed to split water into hydrogen using aqueous organic waste as a sacrificial electron donor.

3. The remediation of persistent organic pollutants, perfluorooctanesulfonate (PFOS) and perfluorooctanoate (PFOA) was evaluated under sonolytic, oxidative, reductive and photolytic methods.

**IGEN International** 2001-2002  
The synthesis of water-soluble and functionalized ruthenium bipyridine compounds.

**Johns Hopkins University** (advisor: D. Howard Fairbrother) 1999 -2001  
Long-chain alkanethiols were synthesized for use as self-assembled monolayers (SAMs) and electron-beam reactions of chlorocarbon-ice films were experimentally investigated.

### TEACHING EXPERIENCE

**California Institute of Technology**  
Teacher’s Assistant – Physical Chemistry Lab Fall/Winter, 2002  
Teacher’s Assistant – Environmental Organic Chemistry Winter, 2003-08

### PUBLICATIONS

H. Park, C.D. Vecitis, M.R. Hoffmann, “Solar-powered electrochemical oxidation of organic compounds coupled with the cathodic production of molecular hydrogen”, *Journal of Physical Chemistry A*, **2008**, 112, 33, 7616.

S. Enami, C.D. Vecitis, J. Cheng, M.R. Hoffmann and A.J. Colussi, “Mass spectrometry of interfacial layers during fast aqueous aerosol/ozone gas reactions of atmospheric interest”, *Chemical Physics Letters*, **2008**, 455, 4-6, 316.

C.D. Vecitis, H. Park, J. Cheng, B.T. Mader, and M.R. Hoffmann, “Kinetics and mechanism of the sonolytic conversion of the aqueous perfluorinated surfactants, perfluorooctanoate (PFOA), and

perfluorooctane sulfonate (PFOS) into inorganic products”, *Journal of Physical Chemistry A*, **2008**, 112, 18, 4261.

H. Park, C.D. Vecitis, W. Choi, O. Weres, M.R. Hoffmann, “Solar-Powered Production of Molecular Hydrogen from Water”, *Journal of Physical Chemistry C*, **2008**, 112, 4, 885.

S. Enami, C.D. Vecitis, J. Cheng, M.R. Hoffmann and A.J. Colussi, “Electrospray Mass Spectrometric Detection of Products and Short-Lived Intermediates in Aqueous Aerosol Microdroplets Exposed to a Reactive Gas”, *Journal of Physical Chemistry A*, **2007**, 111, 50, 13032.

S. Enami, C.D. Vecitis, J. Cheng, M.R. Hoffmann and A.J. Colussi, “Global Inorganic Source of Atmospheric Bromine”, *Journal of Physical Chemistry A*, **2007**, 111, 8749.

J. Cheng, C.D. Vecitis, M.R. Hoffmann and A.J. Colussi, “Experimental Anion Affinities for the Air/Water Interface”, *Journal of Physical Chemistry B*, **2006**, 110, 2006, 25598.

S.R. Carlo, C.C. Perry, J. Torres, A.J. Wagner, C.D. Vecitis, and D.H. Fairbrother, “Surface Reactions of Vapor Phase Titanium Atoms with Halogen and Nitrogen containing Polymers Studied Using in situ X-ray Photoelectron Spectroscopy and Atomic Force Microscopy”, *Applied Surface Science*, **2002**, 195, 93.

A.J. Wagner, C.D. Vecitis, G.M. Wolfe, C.C. Perry, and D.H. Fairbrother, “Effect of Chemical Composition on the Neutral Reaction Products Produced during Electron Beam Irradiation of Carbon Tetrachloride/Water (ice) Films”, *Physical Chemistry Chemical Physics*, **2002**, 4, 3806.

A.J. Wagner, C.D. Vecitis, and D.H. Fairbrother, “Electron-Stimulated Chemical Reactions in Carbon Tetrachloride/Water (ice) Films”, *Journal of Physical Chemistry B*, **2002**, 106, 4432.

A.J. Wagner, S.R. Carlo, C.D. Vecitis, “Effect of X-ray irradiation on the Chemical and Physical Properties of a Semifluorinated Self-assembled Monolayer”, *Langmuir*, **2002**, 18, 1542.

### ***Accepted***

C.D. Vecitis, H. Park, J. Cheng, B.T. Mader, and M.R. Hoffmann, “Enhancement of Perfluorooctanoate and Perfluorooctanesulfonate Activity at Acoustic Cavitation Bubble Interfaces”, *Journal of Physical Chemistry C*, **2008**.

J. Cheng, C.D. Vecitis, H. Park, B.T. Mader, M.R. Hoffmann, “Sonochemical Degradation of Perfluorooctane Sulfonate (PFOS) and Perfluorooctanoate (PFOA) in Landfill Groundwater: Environmental Matrix Effects”, *Environmental Science & Technology*, **2008**.

### ***Submitted***

H. Park, C.D. Vecitis, J. Cheng, N. Dalleska, B.T. Mader, and M.R. Hoffmann, “Reductive Defluorination of Aqueous Perfluorinated Alkyl Surfactants: Effects of Ionic Headgroup and Chain Length”, *Journal of Physical Chemistry A*, **2008**.

### ***Manuscripts in preparation***

C.D. Vecitis, H. Park, J. Cheng, B.T. Mader, M.R. Hoffmann, “Treatment Technologies for Aqueous Perfluorooctanesulfonate and Perfluorooctanoate”

C.D. Vecitis, H. Park, J. Cheng, B.T. Mader, M.R. Hoffmann, “Sonolytic Parameter Optimization for the

## Destruction of Perfluorinated Surfactants”

H. Park, C.D. Vecitis, J. Cheng, N. Dalleska, B.T. Mader, and M.R. Hoffmann, “Mechanism of Reductive Degradation of Perfluorinated Chemicals by Aqueous Electrons: Carboxylate vs. Sulfonate Head Group”

H. Park, C.D. Vecitis, J. Cheng, B.T. Mader, and M.R. Hoffmann, “Effect of Dissolved Gas on Sonolytic Decomposition of Perfluorinated Chemicals”

J. Cheng, C.D. Vecitis, H. Park, B.T. Mader, M.R. Hoffmann, “Sonolytic Degradation of PFOS and PFOA in Groundwater: Ionic Matrix Effects”

**PRESENTATIONS**

C.D. Vecitis, “Sonochemical Degradation of Persistent Organic Pollutants”, EAWAG, Invited Speaker, April, 2008.

C.D. Vecitis, Session Chair of The Physical Chemistry of Environmental Interfaces, *American Chemical Society*, New Orleans, LA, April, 2008.

C.D. Vecitis, H. Park, J. Cheng, B.T. Mader, M.R. Hoffmann, “Ultrasonic irradiation for the destruction of aqueous PFOS and PFOA”, *American Chemical Society*, New Orleans, LA, April, 2008.

C.D. Vecitis, H. Park, J. Cheng, B.T. Mader, M.R. Hoffmann, “Sonochemically enhanced PFOS and PFOA bubble surface activity”, *American Chemical Society*, New Orleans, LA, April, 2008.

M.R. Hoffmann, C.D. Vecitis, H. Park, J. Cheng, B.T. Mader, “Remediation of the Perfluorinated Surfactants, PFOS and PFOA: A Review”, *SETAC*, Milwaukee, WI, October, 2007.

C.D. Vecitis, H. Park, J. Cheng, B.T. Mader, M.R. Hoffmann, “Complete Sonochemical Mineralization of the Perfluorinated Surfactants PFOS and PFOA”, *SETAC*, Milwaukee, WI, October, 2007.

C.D. Vecitis, H. Park, J. Cheng, B.T. Mader, M.R. Hoffmann, Poster, “Sonochemical Degradation of PFOS and PFOA as a Surface Catalyzed Process”, *SETAC*, Milwaukee, WI, October, 2007.

M.R. Hoffmann, C.D. Vecitis, B.T. Mader, “Application of ultrasound for the complete destruction of persistent organic pollutants”, Symposium Honoring Walter Giger, *American Chemical Society*, Boston, MA, August, 2007.

C.D. Vecitis, J. Cheng, Y.J. Wang, H. Park, B.T. Mader, M.R. Hoffmann, “Remediation of PFOS and PFOA: Environmental Matrix and Cc-contaminant effects”, *234th American Chemical Society*, Boston, MA, August, 2007.

M.R. Hoffmann, C.D. Vecitis, H. Park, J. Cheng, B.T. Mader, “Sonochemical transformation of perfluorooctane derivatives PFOS and PFOA into primary inorganic constituents”, *American Chemical Society*, Chicago, IL, March, 2007.

C.D. Vecitis, H. Park, J. Cheng, B.T. Mader, M.R. Hoffmann, “Acoustic Cavitation: A Potential Remediation Technology for On-Site Elimination of Perfluorinated Contaminants”, *American Geophysical Union*, San Francisco, CA, December, 2007.

C.D. Vecitis, J. Cheng, A.J. Colussi, M.R. Hoffmann, "Oxidation of aerosolized iodide by ozone", *American Chemical Society*, San Francisco, CA, September, 2006.

**AWARDS AND FELLOWSHIPS**

Yale Institute of Biospheric Sciences (YIBS) Post-Doctoral Fellow

Kilpatrick Prize in Chemistry

Howard Hughes Summer Research Fellowship