

Heidi B. Martin

Curriculum Vitae

Department of Chemical Engineering
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Education

Case Western Reserve University	Chemistry & Chemical Engineering	B.S./B.S.	1993
Case Western Reserve University	Chemical Engineering	M.S.	1996
Case Western Reserve University	Chemical Engineering	Ph.D.	2000

Research Advisors: John C. Angus & Uziel Landau, Chemical Engineering

Professional Experience

July 2010 – present	Associate Professor with tenure, Chemical Engineering, Case Western Reserve University, Cleveland, OH
August 2002 – June 2010	Assistant Professor, Chemical Engineering, Case Western Reserve University, Cleveland, OH
Aug. 2002-July 2005	Eric T. Nord Assistant Professor, Chemical Engineering, Case Western Reserve University, Cleveland, OH
March 2000- August 2002	NIH (NRSA) Postdoctoral Research Fellow, Chemistry, University of North Carolina, Chapel Hill, NC Postdoctoral Supervisor: R. Mark Wightman, Chemistry, UNC
Summers 1990 –1993	Synthetic Chemist & Process Development Engineer, Lubrizol Corporation, Wickliffe, OH

Refereed Publications

(In reverse chronological order)

1. E.M. Hudak, J.T. Mortimer, and **H.B. Martin**, "Platinum for neural stimulation: the role of contaminant adsorption on electrochemical performance," under review, *Journal of Neural Engineering*.
2. J.M. Halpern and **H.B. Martin**, "Rhenium Alloys as Ductile Substrates for Diamond Thin Film Electrodes," *Diamond and Related Materials*, **42** (2014), 33-40.
3. B.K. Purushothaman, M. Pelsozy, P.W. Morrison Jr., V.F. Lvovich, and **H. B. Martin**, "In situ infrared attenuated total reflectance spectroelectrochemical study of lubricant degradation," *Journal of Applied Electrochemistry*, **42** (2012), 111-120.
4. A.E. Hess, D.M. Sabens, **H.B. Martin**, and C.A. Zorman, "Diamond-on-Polymer Microelectrode Arrays Fabricated Using a Chemical Release Transfer Process," *Journal of Microelectromechanical Systems*, **20** (2011), 867-875.
5. A.E. Hess, D.M. Sabens, **H.B. Martin**, and C.A. Zorman, "Polycrystalline Diamond-on-Polymer Electrode Arrays Fabricated using a Polymer-based Transfer Technique," *Electrochemical and Solid State Letters*, **13** (2010), J129-J131.
6. E.M. Hudak, J.T. Mortimer, and **H.B. Martin**, "Platinum for neural stimulation: voltammetry considerations," *Journal of Neural Engineering*, **7**, 026005-026012 (2010).
7. J.M. Halpern, M.J. Cullins, H.J. Chiel, and **H.B. Martin**, "Chronic *in vivo* nerve electrical recordings of *Aplysia californica* using a boron-doped polycrystalline diamond electrode," *Diamond and Related Materials*, **19** (2010), 178-181.
8. M. Roham, J.M. Halpern, **H.B. Martin**, H.J. Chiel, and P. Mohseni, "Wireless Amperometric Neurochemical Monitoring Using an Integrated Telemetry Circuit," *IEEE Transactions in Biomedical Engineering* **55** (2008) 2628-2634.

9. J.M. Halpern, S. Xie, G.P. Sutton, B.T. Higashikubo, C.A. Chestek, H.J. Chiel and **H.B. Martin**, "Diamond Electrodes for Neurodynamic Studies in *Aplysia Californica*," *Diamond and Related Materials*, **15** (2006) 183-187.
10. S. Xie, G. Shafer, C.G. Wilson, and **H.B. Martin**, "In Vitro Adenosine Detection with a Diamond-Based Sensor," *Diamond and Related Materials*, **15** (2006) 225-228.
11. J. Farrell, F.J. Martin, **H.B. Martin**, W.E. O'Grady, and P. Natishan, "Anodically Generated Short-Lived Species on Boron-Doped Diamond Film Electrodes," *Journal of the Electrochemical Society* **152** (2005) E14-E17.
12. B.D. Bath, **H.B. Martin**, R.M. Wightman, and M.R. Anderson, "Dopamine Adsorption at Surface-Modified Carbon-Fiber Electrodes," *Langmuir* **17** (2001) 7032-7039.
13. **H.B. Martin** and P.W. Morrison, Jr., "Application of a Diamond Thin Film as a Transparent Electrode for in situ Infrared Spectroelectrochemistry," *Electrochemical and Solid State Letters* **4** (2001) E17-E20.
14. J.C. Angus, **H.B. Martin**, U. Landau, Y.E. Evstefeeva, B. Miller, and N. Vinokur, "Conducting Diamond Electrodes: Applications in Electrochemistry," *New Diamond and Frontier Carbon Technology* **9** (1999) 175-187.
15. **H.B. Martin**, A. Argoitia, J.C. Angus, and U. Landau, "Voltammetry Studies of Single-Crystal and Polycrystalline Diamond Electrodes," *Journal of the Electrochemical Society* **146** (1999) 2959-2964.
16. **H.B. Martin**, A. Argoitia, A. Anderson, U. Landau and J.C. Angus, "Hydrogen and Oxygen Evolution on Boron-Doped Diamond Electrodes," *Journal of the Electrochemical Society* **143** (1996) L133-L136.

Conference Proceedings (in reverse chronological order)

1. P.M. Natishan, W.E. O'Grady, F.J. Martin, P.L. Hagans, **H.B. Martin**, and B.R. Stoner, "Electrochemical Oxidation of Organic Compounds using Boron-Doped Diamond Electrodes," to appear, *ECS Transactions*, ECS Spring 2012 meeting, Seattle, WA.
2. A.E. Hess, D.M. Sabens, **H.B. Martin**, and C.A. Zorman, "Polycrystalline Diamond-on-Polymer Electrode Arrays for Mechanically Flexible Neural Interfacing," Proceedings of the Hilton Head Workshop 2010: A Solid-State Sensors, Actuators and Microsystems Workshop, June 6-10, 2010.
3. M. Roham, J.M. Halpern, **H.B. Martin**, H.J. Chiel, and P. Mohseni, "Diamond Microelectrodes and CMOS Microelectronics for Wireless Transmission of Fast-Scan Cyclic Voltammetry," in *Proc. Annu. Intl. IEEE Eng. Med. Biol. Conf. (EMBC '07)* (IEEE, Lyon, France 2007) pp. 6043-6046.
4. J.M. Halpern, S. Xie, J. Schreiber, and **H.B. Martin**, "Kinetics and Adsorption Studies of Biogenic Amine Neurotransmitters at Polycrystalline Diamond Microelectrodes," in *ECS Transactions*, **3** (28), 47-57 (2007).
5. **H.B. Martin**, J.C. Angus, and R.M. Wightman, "Diamond Microelectrodes for Catecholamine Neurotransmitter Detection," in *Sensor Technology*, (AIChE Proc. **P-172**, 2002) 168-174.
6. **H.B. Martin** and P.W. Morrison, Jr., "In situ Infrared Measurements of a Diamond Electrochemical Electrode During Polarization," in *Diamond Materials VII*, edited by G.M. Swain, J.L. Davidson, J.C. Angus, T. Ando, and W.D. Brown (Electrochem. Soc. Proc. **2001-25**, Pennington, N.J. 2001) pp. 66-73.
7. **H.B. Martin**, J.J. D'Urso, P.W. Morrison, Jr., U. Landau, and J.C. Angus, "Analysis of Organic Plating Additives Using Boron-Doped Diamond Electrodes," in *Diamond Materials VI*, edited by J.C. Angus, W.D. Brown, and A. Gicquel (Electrochem. Soc. Proc. **99-32**, Pennington, N.J. 1999) pp. 491-501.
8. **H.B. Martin**, B.A. Smith, J.C. Angus, U. Landau, and A.B. Anderson, "Boron-Doped Diamond Films for Electrochemical Applications," in *Properties and Processing of Vapor-Deposited Coatings*, edited by R.N. Johnson, W.Y. Lee, M.A. Pickering, and B.W. Sheldon (Mat. Res. Soc. Proc. **555**, Pittsburgh, PA 1999) pp. 217-226.

9. A. Argoitia, **H.B. Martin**, J.C. Angus, and U. Landau, "Electrochemical Properties of Single-Crystal and Polycrystalline Diamond Electrodes: A Voltammetric Comparison," in *Diamond Materials V*, edited by J.L. Davidson, W.D. Brown, A. Gicquel, B.V. Spitsyn, and J.C. Angus (Electrochem. Soc. Proc. **97-32**, Pennington, N.J. 1998) pp. 364-376.
10. A. Argoitia, **H.B. Martin**, E.J. Rozak, U. Landau, and J.C. Angus, "Electrochemical Studies of Boron-doped Diamond Electrodes," in *Diamond for Electronic Applications*, edited by D.L. Dreifus, A.T. Collins, T. Humphreys, K. Das, and P. Pehrsson (Mater. Res. Soc. Proc. **416**, Pittsburgh, PA 1996) pp. 349-355.
11. **H.B. Martin**, A. Argoitia, J.C. Angus, A.B. Anderson, and U. Landau, "Boron-Doped Diamond Electrodes for Electrochemical Applications," in *Applications of Diamond Films and Related Materials, Third International Conference*, 1995, A. Feldman, Y. Tzeng, W.A. Yarbrough, M. Yoshikawa, and M. Murakawa (NIST, Gaithersburg, MD 1995) pp. 91-94.

Book Chapter

H.B. Martin, S.C. Eaton, U. Landau, and J.C. Angus, "Chapter 3: Electrochemical Effects on Diamond Surfaces: Wide Potential Window, Reactivity, Spectroscopy, Doping Levels and Surface Conductivity," pp. 26-50, in *Electrochemistry of Diamond*, A. Fujishima, Y. Einaga, T.N. Rao and D.A. Tryk, editors, BKC Tokyo, Elsevier, Amsterdam, 2005.

Utility and Provisional Patents

"Diamond Apparatus and Method of Manufacture," H.B. Martin, C.A. Zorman, A.E. Hess, D.M. Sabens, C.C. Hayman, and J.M. Halpern, Non-Provisional US Patent Application 12/796,659, Filed 6/8/2010.

Invited Presentations

- ◆ *International Symposium on Diamond Electrochemistry*, Keio University, Yokohama, Japan, March 18-19, 2014.
- ◆ Electrical Engineering Department, Duke University, Durham, NC, May 2014.
- ◆ Chemistry Department, Wayne State University, Detroit, MI, September 24, 2012.
- ◆ *New Diamond and Nano Carbons Conference*, San Juan, PR, May 20, 2012.
- ◆ Department of Neurosurgery, Mayo Clinic, Rochester, MN, October 19, 2011.
- ◆ 16th Annual Future of Health Technology Summit, MIT Faculty Club, Cambridge, MA, September 2011.
- ◆ Cleveland FES Center/APT Center, Neural Prosthesis Seminar, December 2010.
- ◆ Diamond 2010 (21st European Conference on Diamond, Diamond-like Materials, Carbon Nanotubes and Nitrides) – September 2010.
- ◆ European Materials Research Society Spring Meeting - Nanodiamond Symposium; June 2010.
- ◆ *Electrochemical Society Spring Meeting - Electrochemistry in Medicine and Biomedical Applications Symposium*; Special (1 hr) Lecture (includes feature in ECS *Interface* publication), April 2010.
- ◆ *New Diamond and Nanocarbons Conference*, Traverse City, MI, June 2009.
- ◆ Physics Department, John Carroll University, December 2008.
- ◆ Department of Materials Science & Engineering, CWRU, October 2008.
- ◆ Department of Chemical Engineering, University of Louisville, March 2006.
- ◆ Yeager Frontiers in Electrochemical Science and Electrochemical Technology Symposium, Case Western Reserve University, October 2005.
- ◆ Department of Chemical Engineering, University of Washington, October 2005.
- ◆ *Diamond Materials IX Symposium*, Electrochemical Society Fall Meeting, Honolulu, HI, October 2004.
- ◆ Department of Chemistry, Tufts University, Medford, MA, April 2003.

- ◆ Department of Chemical Engineering, Case Western Reserve University, September 2002.
- ◆ The Materials Research Society, NC local section Annual Symposium, MCNC campus, Research Triangle Park, NC, November 2001.
- ◆ Research and Development Division, Lubrizol Corporation, Wickliffe, OH, January, 2001.
- ◆ *Second International Symposium of Diamond Electrochemistry and Related Topics*, University of Tokyo, Japan, June 8-9, 1998.

Popular Press Citations

“Implants with a Sparkling Touch,” *Materials World*, December 2010, p. 8.

“A Diamond (-Coated Electrode) is Forever,” *Chemical Engineering Progress*, December 2010, p. 7.

“Gem of an Idea: A Flexible Diamond-Studded Electrode Implanted for Life” *CWRU Press Release*, October 2010 (cited by many online news sources/trade magazines)

“Diamonds De Novo,” *Time Magazine*, February 12, 2007.

“Diamond’s Surface Conductivity” (photos), *Chemical & Engineering News*, December 3, 2007.

“Diamond Materials,” *Value of Research (CWRU)*, Spring 2007.

“Diamond Duo,” *Case Engineering Magazine*, Fall 2005.

“Man Made Diamond: High Quality Gems Promise More than Sparkle,” *Chemical & Engineering News*, February 2, 2004.

Awards and Honors

- ◆ Case School of Engineering, Undergraduate Teaching Award, April 2013.
- ◆ Case Alumni Association - Meritorious Service Award, May 2008.
- ◆ Case School of Engineering Teaching Leader, 2005.
- ◆ Case School of Engineering Research Leader, 2006.
- ◆ Glennan Teaching Fellow, 2006.
- ◆ Eric T. Nord Assistant Professor of Engineering, Endowed Chair (2002-2005).
- ◆ NIH National Research Service Award, 2000-2002.
- ◆ NSF Engineering Education Scholar, 1997.
- ◆ NSF Graduate Fellow, 1993.