Christopher Alan Crouse

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Education

Rice University — Houston, TX
Doctor of Philosophy — June 2005-present
Major: Inorganic chemistry and nanotechnology
Current GPA: 3.99/4.00

Rice University — Houston, TX
Master of Arts — May 2007
Major: Chemistry and nanotechnology
Overall GPA: 3.95/4.00

Central Michigan University — Mt. Pleasant, MI
Master of Science — May 2006
Major: Polymer/Organic Chemistry
Overall GPA: 3.94/4.00

Central Michigan University — Mt. Pleasant, MI
Bachelor of Science, Cum Laude Honors — December 2003
American Chemical Society Certified
Major: Chemistry Minor: Math
Overall GPA: 3.74/4.00

Research and Technical Experience

Rice University, Department of Chemistry
Graduate Research Assistant — June 2005-present
Research Advisor: Prof. Andrew Barron

- Synthesis and characterization of iron-based bimetallic nanoparticles as catalysts towards the growth of single-walled carbon nanotubes
- Vapor-liquid-solid growth and re-growth of carbon nanotubes from spin-on-catalysts
- Synthesis and characterization of ternary and quaternary metal nanoparticles exhibiting deep eutectics towards the growth of single-walled carbon nanotubes
- Preparation of $[H_xPMo_{12}O_{40}CH_4Mo_{72}Fe_{30}(O_2CMe)_{15}O_{254}(H_2O)_{98}]$ and subsequent catalyst optimization studies towards the growth of single-walled carbon nanotubes
- Sidewall functionalization of fluorinated single-walled carbon nanotubes with polyamines to promote solubility in aqueous and biological environments

Central Michigan University, Department of Chemistry
Graduate Research Assistant — January 2004-June 2005
Research Advisor: Dr. Dillip Mohanty

- Synthesis and characterization of novel, unimolecular azo-containing aromatic iniferters for the living radical polymerization of vinyl monomers at temperatures below 100 ^oC
- Step-growth polymerization of thermally stable aromatic poly(thio-ethers) to serve as high temperature sealants
- Chemical crosslinking of aromatic poly(thio-ethers) with inorganic salts
- Thesis: *Synthesis of Novel Iniferters for the Living/Controlled Radical Polymerization of Styrene at 50 ^oC*

Central Michigan University, Department of Chemistry
Undergraduate Research Assistant — January 2002-December 2003
Research Advisor: Dr. Dillip Mohanty

- Organic functionalization of linear polyethyelenimine with nitro-aromatic and aromatic amine species to promote water solubility
- Thesis: *Model Compound Studies for the Modification of Linear Polyethylenimine to Promote Water Solubility*

Central Michigan University, Department of Chemistry
Mass Spectrometer Technician May 2002-May 2003

- Responsible for operation and basic maintenance of Hewlett Packard 5890 GC/MS and Hewlett Packard DIP/MS

Central Michigan University, Department of Chemistry
Chemistry Stockroom Student Assistant February 2001-December 2002

- Assisted in the physical and chemical preparations for undergraduate chemistry laboratory courses

Teaching Experience

Rice University, Department of Chemistry
Graduate Teaching Assistant August 2006-May 2007

- Responsible for training of incoming graduate students and post-doctoral staff on NMR spectrometers and associated software
- Assisted NMR manager in required weekly and bimonthly maintenance of NMR spectrometers

Rice University, Department of Chemistry
Graduate Teaching Assistant August 2005-May 2006

- Teaching assistant for CHEM 352: Introductory Module in Experimental Chemistry II
- Teaching assistant for CHEM 374: Advanced Module in Synthetic Chemistry

Central Michigan University, Department of Chemistry
Graduate Teaching Assistant August 2004-May 2005

- Teaching assistant for CHM 101: Armchair Chemistry
- Teaching assistant for CHM 132: General Chemistry II laboratory
- Teaching assistant for CHM 342: Survey of Organic Chemistry
- Responsible for lab supervision, grading, and pre-lab lectures

Central Michigan University, Department of Athletics
Athletics Department Tutor September 2003-December 2003

- Tutored student-athletes in several subject areas including General Inorganic Chemistry, Organic Chemistry, Inorganic Chemistry, College Algebra, College Trigonometry, Pre-Calculus, Calculus I

Central Michigan University, Opportunities for Talent Development
Intermediate Interdisciplinary Science Student Instructor September 2003-December 2003

- Performed classroom and field instruction of chemistry and water quality studies for local middle school students

Honors and Awards

- Welch Fellowship, Department of Chemistry, Rice University (August 2005-May 2006)
- Outstanding Graduate Teaching Assistant, Department of Chemistry, Central Michigan University (May 2005)
- American Chemical Society-Midland Section College Chemistry Student of the Year (May 2004)
- Chemistry Department Outstanding Undergraduate Research Award, Central Michigan University (May 2004)
- Central Michigan University Dow Scholarship Recipient (August 2000-December 2003)
- Cum Laude Honors, Central Michigan University (December 2003)
- President's List, Central Michigan University (Fall 2003, Summer 2003)
- Dean's List, Central Michigan University (Fall 2000, Spring 2001, Spring 2002, Fall 2002, Spring 2003)
- Valedictorian, Spring Lake High School (June 2000)

Publications

1. A study of the formation, purification and application as a SWNT growth catalyst of the nanocluster $[H_xPMo_{12}O_{40}\subset H_4Mo_{72}Fe_{30}(O_2CMe)_{15}O_{254}(H_2O)_{98}]$. R.E. Anderson, R. Colorado, Jr., C. Crouse, D. Ogrin, B. Maruyama, M. J. Pender, C. L. Edwards, E. Whitsitt, V. C. Moore, D. Koveal, C. Lupu, M. P. Stewart, R. E. Smalley, J. M. Tour, and A R. Barron. *Dalton Trans*., 2006, 3097-3107.

2. Cross-linking of aromatic poly(thioether)s. M. M. Yonkey, C. Crouse, Z-B. Zhang, D.K. Mohanty. *Chinese Journal of Polymer Science*, 2007, 25, 509-517.

3. Synthesis, characterization, and carbon dioxide adsorption of covalently attached polyethylenimine functionalized single-walled carbon nanotubes. C. A. Crouse, E. Dillon and A. R. Barron., *ACS Nano*, in press.

4. Growth and subsequent re-growth of carbon nanotubes from spin on catalysts. C. A. Crouse, R. Colorado, Jr. and A. R. Barron, in preparation.

5. Vertically aligned single-walled carbon nanotubes grown from iron oxide nanoparticles. M. J. Kim, H. Shan, C. A. Crouse, R. Colorado, Jr., E. Haroz, N. Nicholas, C. Kittrell, T. J. Wainerdi, H. K .Schmidt, A. R. Barron, R.H.Hauge, R. E. Smalley, submitted for publication.

Presentations

1. American Chemical Society National Meeting-San Diego, CA, March 2005
   Poster: "Model Compound Studies for the Modification of Linear Polyethylenimine to Promote Water Solubility"

2. American Chemical Society National Meeting-San Francisco, CA, September 2006
   Oral Presentation: "Bimetallic nanoparticles as catalysts for the growth of single-walled carbon nanotubes"

3. American Chemical Society Regional Meeting-Houston, TX, October 2006
   Poster: "Catalyst activation studies for the improved growth of single-walled carbon nanotubes"

4. American Chemical Society National Meeting-Chicago, IL, March 2007
   Oral Presentation: "Synthesis and characterization of covalently attached polyethyleneimine functionalized single-walled carbon nanotubes"

5. Carbon Nanotube Collaborators Workshop-Yellow Springs, OH, November 2007
   Poster: "Nanotube growth and re-growth studies with spin-on-catalysts"

Affiliations

- American Chemical Society (May 2004-present)
- American Chemical Society-Greater Houston Section (June 2005-present)
- American Chemical Society-Midland Section (May 2004-June 2005)
- ACS-Division of Organic Chemistry (May 2004-present)
- ACS-Division of Inorganic Chemistry (June 2005-present)

Instrumentation

- Bruker Avance 400 and 500 MHz Nuclear Magnetic Resonance Spectroscopy (NMR)
- Nicolet Nexus 670 Fourier Tranform-Infrared Spectrscopty (FT-IR)
- TA Instruments 2590 Hi-Res Thermal Gravimetric Analysis (TGA)
- TA Instruments 2910 Modulated Differential Scanning Calorimeter (DSC)
- Sieko 200 Thermal Gravimetric/Differential Thermal Analysis (TG/DTA)
- FEI Quanta 400 Field Emission Gun (FEG) Environmental Scanning Electron Microscopy (ESEM)
- JOEL 2010 and JEM 2010 FasTEM Transmission Electron Spectroscopy (TEM)
- JOEL 2100 Field Emission Gun High Resolution Transmission Electron Microscopy (HRTEM)
- Digital Instruments Nanoscope IIIA Atomic Force Microscopy (AFM)

- Renishaw Raman Microscope
- Cary 5000 UV/Vis-Near IR Spectrometer (UV/Vis)
- Rigaku D/Max Ultima II Powder Diffractometer (XRD)
- Rigaku SmartLab X-ray Diffractometer-Small Angle X-ray Scattering (SAXS)
- Perkin Elmer Inductively Coupled Plasma-Atomic Emission Spectroscopy (ICP-AES)
- PHI Quantera X-ray Photoelectron Spectroscopy (XPS)