

ERICK B. IEZZI, PH.D.
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EDUCATION

Ph.D., Organic Chemistry 2003

Virginia Tech, Blacksburg, VA

Dissertation Title: Organic Functionalizations and Medicinal Applications of the Trimetallic Nitride Endohedral Metallofullerenes

B.S., Chemistry 1999

Duquesne University, Pittsburgh, PA

Magna Cum Laude

RESEARCH EXPERIENCE

Senior Research Chemist 2012 – Present

U.S. Naval Research Laboratory, Washington, DC

Principal investigator and group leader of basic and applied research programs to develop environmentally-friendly and/or smart thermosetting networks to address toxicity, corrosion, or performance issues with legacy networks (e.g. coatings) used on U.S. Navy ships, aircraft, ground vehicles, and submarines.

Notable Accomplishments:

- Developed stimuli-responsive silyl-containing polyurethane (silyl-PU) networks that possess the performance properties of conventional polyurethane aircraft topcoats, yet can be selectively degraded and removed from a strongly adhered substrate using a fluoride salt and without damaging the substrate.
- Developed organosilane polymers with high elongation and formulated a single-component (1K) isocyanate-free polysiloxane topcoat that meets MIL-PRF-85285 (aircraft topcoat) performance requirements. The topcoat demonstrated equivalent performance to conventional polyurethanes when used on active U.S. Navy/Marine Corps aircraft.
- Developed a two-component (2K) isocyanate-free and low-VOC (<70 g/l) polysiloxane topcoat for use on U.S. Navy ground support equipment.
- Developed organosilane polymers and formulated a 1K polysiloxane topcoat to replace the legacy silicone alkyd coatings used on the topsides of Navy surface ships. The polysiloxane coating is applicator-friendly and can be applied over a wide range of temperatures and humidity.

Senior Chemist II March 2008 – August 2012

Excet, Inc. and SAIC at U.S. Naval Research Laboratory, Washington, DC

Lead contractor for developing coatings for use on U.S. Navy surface ships.

Notable Accomplishments:

- Developed an exterior durable 2K polysiloxane nonskid coating to replace the legacy epoxy-based nonskids used on the decks of Navy surface ships and submarines.
- Developed an elastomeric polysulfide network for use as a cavitation and erosion-resistant coating on the rudders of Navy surface ships.

S&T Research Chemist

September 2006 – March 2008

PPG Industries, Inc., Pittsburgh, PA

Principal Investigator for developing fast-curing coatings and spray equipment for the U.S. Air Force, in addition to Global Team Leader for developing non-hazardous and low-VOC topcoats for the Automotive Fleet market.

Notable Accomplishments:

- Developed a UV-curable, low-VOC, and highly flexible anti-corrosion primer to reduce the repaint times of aircraft.
- Supervised the development of a plural-component paint system for application of fast curing aerospace coatings, and assisted PPG's Government Products marketing team in developing a product brochure for commercial sales.
- Developed an isocyanate-free and low-VOC polysiloxane coating for Fleet Vehicles.

National Institutes of Health (NIH) Postdoctoral Research Fellow

January 2004 – August 2006

University of Pittsburgh, Department of Chemistry, Pittsburgh, PA

Performed multi-step synthesis, purification, and characterization of molecules to assemble segments of a large and complex anti-cancer molecule, Diazonamide A.

Notable Accomplishments:

- Developed a novel Heck reaction methodology for asymmetric formation of the C10 quaternary center in Diazonamide A.

Graduate Research Chemist

August 1999 – December 2003

Virginia Tech, Department of Chemistry, Blacksburg, VA

Synthesized water-soluble polyhydroxylated metallofullerenes (metallofullerols) and peptide-based derivatives of metallofullerenes for medicinal applications. Generated novel metallofullerene contrast agents that contained lutetium (for X-ray) or gadolinium (for MRI) atoms.

Notable Accomplishments:

- First individual to functionalize a trimetallic nitride endohedral metallofullerene via synthetic organic methods.
- Developed novel imaging agents with encapsulated metals.

PUBLICATIONS**Peer-Reviewed Articles**

1. Sutyak, K. B.; Iezzi, E. B.; Daniels, G. C.; Camerino, E. Hydrolytically Stable and Thermo-Mechanically Tunable Poly(Urethane) Thermoset Networks that Selectively Degrade and Generate Reusable Molecules. *ACS Appl. Mater. Interfaces* **2022**, *14* (19), 22407–22417.
2. Arcari, A.; Anderson, R. M.; Hangarter, C. M.; Iezzi, E.; Policastro, S. A. Deformation of Aircraft Coating Systems at Fastener-Skin Interfaces. *JDR&E* **2022**, *5* (2), 1–13.
3. Iezzi, E. B.; Camerino, E.; Daniels, G. D.; Wynne, J. H. Silyl-Containing Polyurethanes that Selectively Disassemble with Fluoride Salts. *Coat. Tech.* **2020**, *17* (1), 26–34.
4. Zheng, K.; Zhang, J.; Dodiuk, H.; Kenig, S.; Barry, C.; Iezzi, E. B.; Mead, J. The Effect of Composite Interface Morphology on Wetting States for Nanocomposite Superhydrophobic Coating. *Surf. Coat. Tech.* **2020**, *387*, 125457.
5. Borth, D. J.; Iezzi, E. B.; Dudis, D. S.; Hansen, D. C. Nondestructive Evaluation of Urethane-Ester Coating Systems using the Scanning Kelvin Probe Technique. *Corrosion* **2019**, *75* (5), 457–464.

6. Daniels, G. C.; Camerino, E.; Wynn, J. H.; Iezzi, E. B. Cross-Linked Networks that Selectively and Controllably Disassemble On-Demand via Cascading Bond Cleavage. *Mater. Horiz.* **2018**, *5*, 831–836.
7. Camerino, E.; Daniels, G. C.; Wynne, J. H.; Iezzi, E. B. Synthesis and Kinetics of Disassembly for Silyl-Containing Ethoxycarbonyls using Fluoride Ions. *RSC Adv.* **2018**, *8*, 1884–1888.
8. Sun, X.; Turnage, S.; Iezzi, E. B.; Yang, Y.; Chang, B.; Muthegowda, N. C.; Balijepalli, S. K.; Dhuyvetter, N.; Wang, L. P.; Solanki, K. N.; Rykaczewski, K. Water Permeation and Corrosion Resistance of Single and Two Component Hydrophobic Polysiloxane Barrier Coatings. *J. Coat. Technol. Res.* **2017**, *14* (6), 1247–1258.
9. Iezzi, E. Novel Isocyanate-Free Moisture-Curable Polymers for Single-Component Polysiloxane Topcoats. *Coat. Tech.* **2017**, *14*, 22–28.
10. Iezzi, E.; Tagert, J. Single-Component Polysiloxane Topcoat for Navy Surface Ships. *J. Prot. Coat. Lin.* **2016**, *33* (11), 26–31.
11. Daniels, G. C.; Iezzi, E. B.; Fulmer, P. A.; Wynne, J. H. Synergistic Antimicrobial and Surface Free Energy of Sol–Gel Coatings Containing Fluorosilanes and Quaternary Ammonium. *Prog. Org. Coat.* **2016**, *95*, 91–99.
12. Rykaczewski, K.; Mieritz, D. G.; Liu, M.; Iezzi, E. B.; Sun, X.; Wang, L. P.; Solanki, K. N.; Seo, D.-K.; Wang, R. Y. Far-Reaching Geometrical Artefacts due to Thermal Decomposition of Polymeric Coatings Around Focused Ion Beam Milled Pigment Particles. *J. Microsc.* **2016**, *262* (3), 316–325.
13. Iezzi, E.; Tagert, J.; Martin, J.; Sleboznick, P.; Wegand, J. Gaining Traction: Low VOC and Sprayable Siloxane Nonskid/Nonslip Coating for the U.S. Navy and Non-Military Markets. *J. Prot. Coat. Lin.* **2014**, *31*, 36–41.
14. Cai, T.; Ge, Z.; Iezzi, E. B.; Glass, T. E.; Harich, K.; Gibson, H. W.; Dorn, H. C. Synthesis and Characterization of the First Trimetallic Nitride Templated Pyrrolidino Endohedral Metallofullerenes. *Chem. Comm.* **2005**, 3594–3596.
15. Duchamp, J. C.; Demortier, A.; Fletcher, K. R.; Dorn, D.; Iezzi, E. B.; Glass, T.; Dorn, H. C. An Isomer of the Endohedral Metallofullerene Sc₃N@C₈₀ with D_{5h} Symmetry. *Chem. Phys. Lett.* **2003**, *375*, 655–659.
16. Iezzi, E. B.; Duchamp, J. C.; Harich, K.; Glass, T.; Lee, H. M.; Olmstead, M. M.; Balch, A. L.; Dorn, H. C. A Symmetric Derivative of the Trimetallic Nitride Endohedral Metallofullerene, Sc₃N@C₈₀. *J. Am. Chem. Soc.* **2002**, *124*, 524–525.
17. Iezzi, E. B.; Duchamp, J. C.; Fletcher, K. R.; Glass, T. E.; Dorn, H. C. Lutetium-based Trimetallic Nitride Endohedral Metallofullerenes: New Contrast Agents. *Nano Lett.* **2002**, *2*, 1187–1190.
18. Lee, H.-M.; Olmstead, M. M.; Iezzi, E.; Duchamp, J. C.; Dorn, H. C.; Balch, A. L. Crystallographic Characterization and Structural Analysis of the First Organic Functionalization Product of the Endohedral Fullerene Sc₃N@C₈₀. *J. Am. Chem. Soc.* **2002**, *124*, 3494–3495.
19. Iezzi, E. B.; Cromer, F.; Stevenson, P.; Dorn, H. C. Synthesis of the First Water-soluble Trimetallic Nitride Endohedral Metallofullerols. *Synth. Met.* **2002**, *128*, 289–291.

PATENTS

1. Iezzi, E. B. Moisture-Curable Omniphobic Coatings. U.S. Patent 11,028,287, June 8, 2021.
2. Iezzi, E. B.; Camerino, E.; Daniels, G.; Wynne, J. H. Silyl-Containing Alcohols and Amines for Thermosets that Disassemble On-Demand. U.S. Patent 10,730,993, August 4, 2020.
3. Iezzi, E. B. Two-Component Siloxane-Based Coatings Containing Polymers with Urea Linkages and Terminal Alkoxysilanes. Australian Patent 2015337050, January 23, 2020.
4. Iezzi, E. B. Siloxane-Based Coatings Containing Polymers with Urea Linkages and Terminal Alkoxysilanes. U.S. Patent 10,190,020, January 29, 2019.
5. Iezzi, E. Two-Component Siloxane-Based Coatings Containing Polymers with Urea Linkages and Terminal Alkoxysilanes, European Patent 3,209,739, June 19, 2019.

6. Iezzi, E. B. Rapid Cure Polysulfide Coatings for Cavitation Resistance, Erosion Resistance, and Sound Dampening, U.S. Patent 9,828,508, November 28, 2017.
7. Iezzi, E. B. Single-Component Moisture-Curable Coatings Based on N-Substituted Urea Polymers with Extended Chains and Terminal Alkoxysilanes, European Patent 2,970,709, October 18, 2017.
8. Iezzi, E. B. Single-Component Moisture-Curable Coatings Based on N-Substituted Urea Polymers with Extended Chains and Terminal Alkoxysilanes, U.S. Patent 9,701,868, July 11, 2017.
9. Iezzi, E. Two-Component Siloxane-Based Coatings Containing Polymers with Urea Linkages and Terminal Alkoxysilanes, US Patent 9,587,143, March 7, 2017.
10. Iezzi, E. Exterior Durable Siloxane-Based Nonskid/Nonslip Coating, US Patent 9,540,543, January 10, 2017.
11. Iezzi, E. B. Single Component Coating having Alkoxysilane-Terminated Urea Resin, US Patent 9,221,942, December 29, 2015.
12. Iezzi, E. B. Single-Component Moisture-Curable Coatings Based on N-Substituted Urea Polymers with Extended Chains and Terminal Alkoxysilanes, U.S. Patent 9,139,753, September 22, 2015.
13. Iezzi, E. B.; Martin, J; Slebodnick, P. Direct-to-Metal and Exterior Durable Non-Skid Coating, U.S. Patent 9,034,946, May 19, 2015.
14. Iezzi, E. B.; Martin, J; Slebodnick, P. Direct-to-Metal and Exterior Durable Non-Skid Coating, U.S. Patent 9,006,307, April 14, 2015.
15. Iezzi, E. B.; Bowman, M. P.; Walters, D. N. Multilayer Coatings Suitable for Aerospace Applications. European Patent 2,183,060, July 16, 2014.
16. Iezzi, E. B.; Bowman, M. P.; Walters, D. N. Multilayer Coatings Suitable for Aerospace Applications, U.S. Patent 8,414,981, April 9, 2013.
17. Martz, J. T.; Iezzi, E. B. Low Temperature Curable Coating Compositions and Related Methods, U.S. Patent 8,193,293, June 5, 2012.
18. Iezzi, E. B. Single Component Coating Having Alkoxysilane-Terminated N-Substituted Urea Resins, U.S. Patent 8,133,964, March 13, 2012.
19. Martz, J. T.; Iezzi, E. B. Copolymers with Hydrolyzable Groups by Reacting Glycidyl Ester and/or Ether, Polyol and Hydrolyzable Group Containing Compound, U.S. Patent 7,842,756, November 30, 2010.
20. Dorn, H. C.; Iezzi, E. B.; Duchamp, J. Endohedral Metallofullerene Derivatives, U.S. Patent 7,358,343, April 15, 2008.

ORAL PRESENTATIONS (selected)

1. E. Iezzi, “Demonstration and Validation of Isocyanate-Free, Polysiloxane Aerospace Topcoats”, 2022 American Coatings Conference, Indianapolis, IN, April 4-7, 2022.
2. E. Iezzi, K. B. Sutyak, Grant C. Daniels, Eugene Camerino, “Selective and Environmentally Friendly Removal of Silyl-PU Coatings from Substrates”, 2022 American Coatings Conference, Indianapolis, IN, April 4-7, 2022.
3. E. Iezzi, E. Camerino, K. Sutyak, G. Daniels, “Selectively Strippable Silyl-Containing Aerospace Topcoats using Environmentally Friendly Fluoride Salts (WP20-1106)”, 2021 SERDP-ESTCP Symposium, Virtual Conference, November 29 – December 3, 2021.
4. G. C. Daniels, E. Camerino, K. B. Sutyak, E. B. Iezzi, “Selective Removal and Disassembly of Cross-Linked Silyl-Polyurethanes”, American Chemical Society National Meeting, Virtual Conference, August 23-27, 2020.
5. K. B. Sutyak, G. C. Daniels, E. Camerino, E. B. Iezzi, “Extended Chain Silyl-Based Diols and Triols for Degradable Cross-Linked Polyurethane Networks”, American Chemical Society National Meeting, Virtual Conference, August 23-27, 2020.

6. E. B. Iezzi, E. Camerino, G. C. Daniels, J. H. Wynne, “Cross-Linked Coatings that Selectively Degrade with Fluoride Salts”, 2020 Smart Coatings Conference, Orlando, FL, February, 26-28, 2020. **Invited Speaker**
7. E. B. Iezzi, “Isocyanate-Free, High-Performance Polysiloxane Topcoats for DoD Aircraft and Ground Support Equipment”, ASETS Defense 2018, Denver, CO, August 21-23, 2018. **Invited Speaker**
8. M. J. Strom, E. B. Iezzi, J. Easterday, “Enhanced resistance to hydration, delamination, and corrosion of U.S. Marine Corps topcoats”, EuroCorr 2018, Krakow, Poland, September 9-13, 2018.
9. E. M. Durke and E. B. Iezzi, “N-Substituted Polyurea-Silane Polymers for Coatings with Enhanced CWA Resistance”, American Chemical Society National Meeting, Boston, MA, August 22, 2018.
10. G. C. Daniels, E. Camerino, J. H. Wynne, E. B. Iezzi, “Cross-linked polymer networks that selectively and controllably disassemble on-demand via cascading bond cleavage”, American Chemical Society National Meeting, Boston, MA, August 21, 2018.
11. E. Iezzi and G. Kuljian, G. “Ship’s Force Application of Next-Generation Polysiloxane Topcoat”, Mega Rust Conference, May 22-24, 2018.
12. E. Iezzi, “Isocyanate-Free and Low VOC Polysiloxanes as Replacements for Aerospace Polyurethane Topcoats”, SERDP-ESTCP Symposium, November 29, 2017. **Invited Speaker**
13. E. Iezzi, M. Strom, S. Eppard, “Hydrophobic Topcoats for Enhanced Corrosion Resistance of Marine Corps Ground Vehicles”, DoD-Allied Nations Technical Corrosion Conference, 7August 7-10, 2017. **Invited Speaker**
14. J. Tagert, E. Iezzi, J. Martin, S. Gulati, S. Eppard, C. Langaster, “Universal Pigment Package for MIL-PRF-24635 Polysiloxane Topside Coatings”, Mega Rust Conference, June 20-22, 2017.
15. E. Camerino, G. Daniels, J. Wynne, E. Iezzi, “Novel Thermosets that Rapidly Disassemble in the Presence of a Chemical Stimulus”, American Chemical Society National Meeting, August 20-24, 2017.
16. E. Iezzi, “Novel Isocyanate-Free and Low VOC Polysiloxane Topcoats as Replacements for Military-Grade Polyurethanes”, Advanced Coatings Conference, April 10-11, 2017. **Invited Speaker**
17. E. Iezzi, “Novel Isocyanate-Free Moisture-Curable Polymers for Single-Component Polysiloxane Topcoats”, Coatings Technology Conference, March 20-22, 2017.
18. E. Iezzi, “Isocyanate-Free Polysiloxane Topcoats for Aircraft and Ground Support Equipment”, ASETS Defense Conference, December 6-8, 2016. **Invited Speaker**
19. E. Iezzi, “Isocyanate-Free Single-Component Polysiloxane Topcoats for Surface Ships and Aircraft”, Mega Rust Conference, June 21-23, 2016.
20. E. Iezzi, “Isocyanate-Free Single-Component Polysiloxane Topcoats for Surface Ships and Aircraft”, Navy Materials Community of Interest (NMCOI) Forum, April 12-14, 2016.
21. E. Iezzi, “Single-Component Polysiloxane Topcoats for Navy Surface Ships and Aircraft”, DoD Corrosion Conference, November 15-19, 2015. **Invited Speaker**
22. E. Iezzi, “Single-Component Polysiloxane: An Advanced Coating for Navy and Surface Ship Topsides”, The Society of Protective Coatings (SSPC) Conference, January 28, 2015. **Invited Speaker**
23. E. Iezzi, J. Tagert, P. Slebodnick, J. Wegand, J. Martin, “Qualification Testing and Demonstrations of a Rollable/Sprayable Siloxane Nonskid”, Mega Rust Conference, June 2, 2015. **Invited Speaker**
24. E. Iezzi, J. Tagert, J. Martin, P. Slebodnick, J. Wegand, “A Low VOC and Sprayable Siloxane Nonskid/Nonslip Coating for the U.S. Navy and Non Military Markets”, The Society of Protective Coatings (SSPC) Conference, February 2014. **Invited Speaker**

ARTICLES HIGHLIGHTING RESEARCH

- Mission Accomplished: USS Essex Sailors Trained as Coatings Applicators. *Coatings Pro Magazine*, November 2020, 32-35.
- First Line of Defense: New Topcoats for Air and Ground Vehicles. *Future Force* 2020, 6 (3), 12-15.

- NRL Develops Environmentally and Painter-Friendly Topcoat for Aircraft, *NRL Press Release*, <https://www.nrl.navy.mil/news/releases/nrl-develops-environmentally-and-painter-friendly-topcoat-aircraft>, June 5, 2019.
- NRL Pigment Package for Ships Slows Discoloration, Lowers Solar Temperature Load, *NRL Press Release*, <https://www.nrl.navy.mil/news/releases/nrl-pigment-package-ships-slows-discoloration-lowers-solar-temperature-load>, July 30, 2019.
- New Paint Simplifies Maintenance for Sailors. *Machine Design*, September 27, 2017.
- NRL-Developed Topcoat Applied on Entire Freeboard of Navy Ship. *NRL Press Release*, July 12, 2017.
- USS Essex sailing with newly-developed coating. *Naval Today*, July 20, 2017.
- Advanced Non-Isocyanate Topcoats. *Future Force*, Fall 2015.
- War on Corrosion: News from the Front, *Paint Square Magazine*, January 16, 2013.
- NRL Scientists Hit the Deck with New Nonskid Coating. *Signal Magazine*, July 13, 2012.
- Exotic Fullerene: Synthesis of Metallofullerene Derivative Brings Medicinal Applications Closer. *Chem. Eng. News* 2002, 80 (4), 15.
- Better Contrast? Fullerene-Based Agents Could Give Physicians a New View, *Sci. News*, 2002, 162 (2), 27.