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Profile

Polymer Science and Engineering • Research & Development • Product & Commercial Development • Manufacturing

Excellent record of professional accomplishment achieved by acquiring both a broad knowledge of a wide range of technology areas and expertise in best practices. Inventor or co-inventor of 26 US patents and 20 published applications. Success as a leader across a broad spectrum of industries, ranging from medium sized specialty materials, large chemicals and fibers, and pharmaceutical start-ups. Experienced in leading multifunctional, global teams and a track record of success with product and commercial development in areas as diverse as Japan, China, India and the EU.

Areas of Expertise

Capstone Design
New Product Development
IP Development & Protection
Project Management
Medical Device & Agrichemical Validation
Cross-functional & Global Team Leadership
Customer Relationship Management

Polymer & Materials Science
Fiber, Film, Extrusion Processes
Material Surface Science & Fluidics
Advanced Composites, Polymer Sintering
Chemical & Physical Analysis
Manufacturing Process Improvement
EPA, FDA, ISO Standards/Regulations

PROFILE

VCU SCHOOL OF ENGINEERING

Jun 2014 - present

Associate Professor – Director of Project Outreach

Report to Executive Associate Dean, School of Engineering.

Engineering School coordinator for Capstone Senior Design. Responsibilities include:

- Administering and representing Capstone Design program:
 - Budget, website, project identification and Capstone Design Expo.
 - Identifying best practices (internal and external) and implementing them in consultation with faculty.
 - Reaching out to external partners for project ideas.
 - Increasing cross-departmental projects.
- External outreach:
 - Identifying external partners (industry, non-profit and VCU Health Sciences).
 - Working with partners to bring in Capstone Design Projects, Vertically Integrated Projects and collaborations with School of Engineering faculty.
 - On Technical Advisory Committee for CCAM (Commonwealth Center for Advanced Manufacturing).

- Team teaching Polymer Engineering course.
- Teach a “Vertically Integrated Project” multidisciplinary course (20 undergraduate and graduate students “Engineering Critical Patient Care”
- Teach a senior level Capstone Design lecture class.

Highlights

- Established and lead faculty Capstone Steering Committee.
- Increased outside sponsorship of Capstone projects from 10 (or 16%) in AY 2013-14 to 41 (53%) in AY 2014-15 and over 70% in AY 2015-16.
- Established system to raise money via donations from project sponsors to fund the Capstone Design program.
- Led team which raised over \$40,000 in donations for Capstone in first year of solicitation and pledged over \$100,000 in AY 2015-16.
- Implemented equitable funding process for Capstone teams.
- Established Intellectual Property protocols for internal and externally sourced projects.
- Established sponsored projects with Pharmacy, OB/GYN, Otolaryngology, Anesthesia, Dentistry, Cardiology, and Radiology.
- Established VIP program “Engineering Critical Patient Care” with 15 cross disciplinary engineering undergraduates and four Nurse Anesthesia graduate students.

4WARD INNOVATIONS LLC, Midlothian, VA

Jan 2014 – present

President

Founder and sole proprietor of 4Ward Innovations LLC, a Product and Market Development consulting company. Offer services in Material Science-related New Business Development. Consulting topics to-date have included advanced filtration, nano-fiber technology, meltblown fiber applications, advanced wound care products and high temperature-resistant polymers.

ESSENTRA POROUS TECHNOLOGIES, Colonial Heights, VA

May 2001 – Dec 2013

Vice President, Research & Development

Led R & D team. Reported to President and Commercial Development EVP. Member of the Executive team. Responsible for new product and technology development efforts worldwide:

- Focus: materials and fiber science directed at fluid wicking, delivery and storage components.
- Application expertise: diagnostics, medical components, ink jet printing, writing instruments, filtration and household products.
- Led global R & D in USA (Virginia, Massachusetts), Korea, China, and Germany.
- Managed Intellectual Property activities: patent filings, prosecution, litigation and strategy.

Highlights

- New Product Lines:
 - Enhanced ink release technology for ink jet reservoirs.
 - Components for saliva-and urine-based rapid diagnostics.
 - Absorptive and fluid delivery components for surgical uses.
 - Broad range of synthetic media for household products.
 - Direct formed industrial/automotive filter elements.
- Led development, with a key supplier, of a new fiber-based technology that has grown into a major product line.

- Team developed novel direct-formed filtration media, with utility in oil coalescing, water removal from diesel fuel, water purification and chemical process filtration.
- Led company's first successful sustained new product introduction in Japan.
- Led integration of two acquired companies' R & D (Korea, Massachusetts)
- Established diverse intellectual property portfolio, including 10 issued US patents during tenure plus 12 pending, and process trade secrets. Experience in interference actions, prosecuting IP breaches.
- Successfully crafted joint development agreements resulting in successful commercialization of products.
- Developed and implemented customized stage-gate commercialization process.

NOBEX CORPORATION, Durham, NC

Aug 2000 – April 2001

Director, Drug Discovery and Project Management

Led project management activities and managed drug discovery group for this venture funded, 50-scientist drug-delivery company.

- Implemented project review and management system.
- Oversaw development of APAZA (inflammatory bowel disease drug) to Phase 1 clinical trials.
- Developed partnering packages for Calcitonin (osteoporosis) and Human Growth Hormone, leading to deals with Elan Pharmaceuticals and Pharmacia.

HOECHST CELANESE (and Related Companies)

1981 – 2000

Celanese Acetate Celriver Plant, Rock Hill, SC

March 1998 – July 2000

A 2000 employee polymer and textile fiber manufacturing plant.

Process Technology Manager

Led plant process and engineering, process safety, laboratories, and capital construction. Managed 63 professionals, 35 analysts (union), and 125 contractors. Accountability for \$25M capital budget, plant improvement and cost reduction initiatives. Team improved total plant process yield and costs per unit volume from worst to best in Celanese during tenure.

Hoechst Corporate Research, Frankfurt, Germany

March 1997 – Feb 1998

Project Manager

Led German, French, and Japanese team (14 people) that developed innovative powder coating and color toner technology for subsidiary Herberts Coatings.

- Successful scale-up from bench to pilot scale, new customer and business strategy, issued patents, and production plant design and unit operations engineering.
- Orchestrated successful transfer from R & D to business line.

Hoechst Celanese Corporate Research, Charlotte, NC

1992 – 1997

Project Manager

- Initiated and led joint project development team (9 people) with Michelin on elastomeric air-permeation barrier coatings. Negotiated joint development agreement with Michelin (France/USA). Won Herberts 1998 Technology Award 1st prize. The product developed is now commercial with Inmat, Bridgewater, NJ.
- Led US/German due diligence team (8 people) evaluating \$50M purchase of biotechnology-based polylactic acid business from Chronopol (Coors Brewing Company).

- Initiated and led global R & D/Hoechst Diafoil Team that developed and marketed high performance capacitor film based on a novel polyester. Included monomer, polymer and film process development, project engineering, and market development.
- Led R & D Group (14 people) developing Celbond non-woven filtration /absorption technology. Now a successful business for PGI Nonwovens.

Hoechst Central Polymer Research, Frankfurt, Germany 1991 – 1992

Research Associate

Developed high temperature thermoplastic, liquid crystal polyester films.

Hoechst Celanese R & D, Summit, NJ 1989 – 1991

Section Leader

Led group responsible for high strength/high modulus fiber and high temperature polymer research.

Celanese PBI/Advanced Materials, Charlotte, NC 1981 - 1989

Research Chemist

Member of plant start-up team. Scaled up polybenzimidazole (PBI) process from lab to production, developed patented PBI sintering process (Celazole®) and developed PBI composite matrix resins for aerospace applications. Celazole and PBI are ongoing commercial products.

EDUCATION

University of North Carolina, Chapel Hill, NC
Ph.D., Organic and Inorganic Chemistry, Eastman Kodak Fellow 1980

Duke University, Durham, NC
B.S., Chemistry 1976

CONTINUING EDUCATION

University of Richmond Robins School of Business: “Fast Moving Consumer Goods”
University of Chicago, Booth School of Business: “High Performance Leadership”
California Institute of Technology Industrial Relations Center: “Accelerating New Product Development”
UNC Kenan/Flagler School of Business: “Bunzl Senior Management Leadership Program”
American Management Association: “Advanced Project Management”
Industrial Research Institute: “R&D Leadership and Management”
University of Michigan Ross School of Business: “Introductory Leadership”

ADVISORY BOARDS

University of North Carolina Chemistry Department
Virginia Commonwealth University Chemical and Biological Engineering Department

PROFESSIONAL AFFILIATIONS

American Chemical Society
American Filtration and Separations Society

LANGUAGES

English (Native), German (Fluent)

Patents and Publications

1. US 9330580 B2. Issued May 3, 2016; Assay Wick with Analyte Fluid Sufficiency Indicator, Ward, Bennett C.; Xiang, Jian; Tibbs, Stacey L.; Rogova, Yelena N.; Assignee Essentra Porous Technologies Corp.
2. US 9155299 B2. Issued October 13, 2015, AU 2010322125 B2, Issued May 9, 2015; Bonded Fiber Matrix Containing Encapsulation Complex, Jacobson, Richard Martin, Ward, Bennett Clayton, Xiang, Jian. Assignee Agrofresh, Inc.
3. US 20150272207 A1, Published Oct 1, 2015, Tobacco Smoke Filter, Reed, James D.; Ward, Bennett C., Assignee: Essentra Filter Products Development Co. Pte. Ltd., Singapore
4. US 2015012550 A1 Published May 7, 2015 and WO 2015070085 A2 Published May 14, 2015; Bicomponent Fibers, Products Formed Therefrom and Methods of Making the Same; Ward, Bennett C., Dillie, Brenton D.; assignee Essentra Porous Technologies.
5. US 8939295 B2. Issued January 27, 2015, EP 2398633 B1, issued May 7, 2014 and , JP 5539407 B2, issued July 14, 2014; Multi-Layer, Fluid Transmissive Fiber Structures Containing Nanofibers and a Method of Manufacturing Such Structures; Ward, Bennett C., Stoltz, Geoffrey M.; assignee, Essentra Porous Technologies.
6. WO 2014076488 A1. Published May 22, 2014, Moisture Control Label, Ward, Bennett Clayton; Xiang, Jian; Gater, Jenny; Allen, Philip John, Assignee: Essentra plc.
7. WO 2014078534 A1. Published May 22, 2014, Assay Wick with Analyte Fluid Sufficiency Indicator, Ward, Bennett C.; Xiang, Jian; Tibbs, Stacey; Rogova, Yelena N., Assignee: Essentra Porous Technologies Corp.
8. Advancements in Coalescing Filters for Transportation and Industrial Filtration, Novel Direct-Formed Filter Structures, October 14, 2013, American Filtration and Separations Society, Cincinnati, Ohio, Dillie, Brent D., Ward, Bennett C.
9. Reducing Complexity and Cost through Technology: Direct Formed 2- and 3-d Filter Structures for Use in Transportation and Industrial Filtration, May 7, 2013, American Filtration and Separations Society, Bloomington, MN, Dillie, Brent D., Ward, Bennett C.
10. US8334034 B2: Issued December 12, 2012, Rapid Release and Anti-Drip Porous Reservoirs, Stoltz, Geoffrey M.; Ward, Bennett C.; Binshtok, Ronald J.; Lisk, James R.; assignee, Filtrona Porous Technologies.
11. Fluid Delivery and Absorption Components for Diagnostic Devices, *In-Vitro* Diagnostics Technology Webcast, October 22, 2012, Ward, Bennett C.
12. Fluid Delivery and Absorption Components for Microfluidic and other Diagnostic Devices, American Association for Clinical Chemistry Conference, July 17, 2012, Los Angeles, California, Ward, Bennett C., Xiang, Jian, DuPuis, David.
13. Direct Formed 2- and 3-d Filter Structures, American Filtration and Separations Society Spring Conference, June 27, 2012, Boca Raton, Florida, Ward, Bennett C., Grove, Dale.
14. US8047453B2: Issued November 1, 2011, Neutral Displacement Wick, Ward, Bennett C.; Broosch, Wolfgang; Kutscha, Bernhard; assignee, Filtrona Porous Technologies.
15. WO2011062950A3: Published December 29, 2011, Fiber Structures containing Encapsulation Complex, Jacobson, Richard, Ward, Bennett C., Xiang, Jian; assignee Dow AgroScience.

16. US7731102: Issued June 8, 2010, Neutral Displacement Wick, Ward, Bennett C.; Broosch, Wolfgang; Kutscha, Bernhard; assignee, Filtrona Richmond, Inc.
17. US20080251599A1: Published October 16, 2008, Vapor Emitting Device, Ward, Bennett C.; Xiang, Jian; Rogova, Yelena N; assignee Filtrona Richmond, Inc.
18. US20080187751A1: Published August 7, 2008, Porous Reservoirs Formed From Side-By-Side Bicomponent Fibers, Ward, Bennett C.; Stoltz, Geoffrey M.; Payne, Joseph B; assignee Filtrona Richmond, Inc.
19. US7291263: Issued November 6, 2007: Polymeric fiber rods for separation applications, Ward, Bennett Clayton; Mihindukulasuriya, Samila; Harris, David Bradley; Payne, Joseph Barrett; assignee, Filtrona Richmond, Inc.
20. US7290668: Issued November 6, 2007: Bicomponent fiber wick, Ward, Bennett Clayton; Harris, David B.; Xiang, Jian; Harris, Jr., Thomas E.; assignee, Filtrona Richmond, Inc.
21. US20060237375A1: Published October 26, 2006: Bonded fiber structures for use in blood separation, Xiang, Jian; Ward, Bennett C.; Schneekloth, Andreas; Payne JR., Jackie F.; assignee, Filtrona Richmond, Inc.
22. US20060216506A1: Published September 28, 2006: Multicomponent fibers having elastomeric components and bonded structures formed therefrom, Xiang, Jian; Ward, Bennett C.; Schneekloth, Andreas; Payne JR., Jackie F.; assignee, Filtrona Richmond, Inc.
23. US20060216491A1: Published September 28, 2006: Bonded structures formed form multicomponent fibers having elastomeric components for use as ink reservoirs, Ward, Bennett C.; Xiang, Jian; Schneekloth, Andreas; Payne JR., Jackie F.; Payne, Joseph; assignee, Filtrona Richmond, Inc.
24. US20060207234A1: Published September 21, 2006: Coalescing filter elements comprising self-sustaining, bonded fiber structures, Ward, Bennett C.; Xiang, Jian; Harris JR., Thomas E.; Binshtok, Ronald J.; assignee, Filtrona Richmond, Inc.
25. "Novel Saliva Collection Media for Drug of Abuse Applications", Jian Xiang, Bennett C. Ward, C. Richard Crooks, July 15, 2006, American Association of Clinical Chemistry, San Diego, CA.
26. US20060163152A1: Published July 27, 2006: Porous composite materials comprising a plurality of bonded fiber component structures, Ward, Bennett C.; Broosch, Wolfgang; Kutscha, Bernhard E.; Kemper, Dirk H.; assignee, Filtrona Richmond, Inc.
27. US7018031: Issued March 28, 2006: Porous substrate for ink delivery systems; Ward, Bennett C.; Spencer, Michael W.; Payne, Jackie; Harris, David B.; Stoltz, Geoffrey M.; Schneekloth, Andreas; assignee, Filtrona Richmond, Inc.
28. US20060034886A1: Published February 16, 2006: Bonded fiber structures for use in controlling fluid flow, Ward, Bennett C.; Xiang, Jian; Harris, David B.; Payne JR., Jackie F., assignee, Filtrona Richmond, Inc.
29. US20050153132A1: Published April 7, 2005: Melt blown fiber structures for use in high strength wicks, Ward, Bennett C.; Long, Robert D.; Nelson, Donald F.; Nelson, Raymond J.; Payne JR., Jackie F.; Yancey, E. Vaughan, assignee, Filtrona Richmond, Inc.
30. US20050072737A1: Published April 7, 2005: Polymeric fiber rods for separation applications, Ward, Bennett C., Mihindukulasuriya, Samila, Harris, David, Payne, Joseph B., Assignee: Filtrona Richmond, Inc.

31. US6840692: Issued January 11, 2005: Method and apparatus for making NIBS and ink reservoirs for writing and marking instruments and the resultant products: Ward, Bennett C.; Long, Robert D.; Nelson, Donald F.; Nelson, Raymond J.; Payne, Jr., Jackie F.; Yancey, E. Vaughan; Assignee Filtrona Richmond, Inc.
32. US6815911: Issued November 9, 2004: Method and apparatus for applying additive to fibrous products and products produced thereby: Ward, Bennett C.; Nelson, Raymond J.; Pugh, Roy B.; Payne, Jackie F.; Nutter, Brian V.; Spencer, Michael W.; assignee, Filtrona Richmond, Inc.
33. "Potentially Single Use, Fiber-Based, Monolithic Stationary Phases for the Separation of Proteins via HPLC", Joseph B. Payne, Bennett C. Ward, Jian Xiang, July 15, 2004, HPLC Symposium, Philadelphia, PA.
34. "A Novel Approach to Separating Proteins Using Bonded Fiber Cartridges as the Stationary Phase", R. Kenneth Marcus, Rayman D. Stanelle, Clemson University, Joseph B. Payne, Bennett C. Ward, July 15, 2004, HPLC Symposium, Philadelphia, PA
35. "Novel Approaches for Protein Separation Media Using Bonded Fiber Technology", Bennett C. Ward, Joseph Payne, Samila H. Mihindukulasuriya, March 6, 2004, Pittcon Conference, Chicago, Illinois.
36. US20040041285A1: Published March 4, 2004: Multi-component flow regulator wicks and methods of making multi-component flow regulator: Xiang, Jian; Ward, Bennett; Fallecker, Curtis; Sanroma, Ulises; Nelson, Raymond; Harris, Thomas; Green, Jeffrey; Assignee, Filtrona Richmond, Inc.
37. US20030116499A1: Published June 26, 2003: Medium for isolating, detecting, separating, or purifying chemical and biological substances: Ward, Bennett C.; Sanroma, Ulises C.; Finch,, Dan O.; Fallecker, Curtis N.; Billups, Ronald E.; assignee, Filtrona Richmond, Inc.
38. "Fibrous Surface Active Media", Samila H. Mihindukulasuriya, Bennett C. Ward, March 9, 2003, Pittcon Conference, Orlando, Florida
39. EP1082376B1: Issued October 16, 2002: MANUFACTURING METHODS, BASED ON NON AQUEOUS DISPERSION TECHNIQUES, TO PRODUCE SPHERICAL POLYESTER PARTICLES WITH NARROW PARTICLE SIZE DISTRIBUTIONS AND TAILORABLE MEAN PARTICLE SIZES: WARD, Bennett, Clayton; WULF, Stefan; JACOBS, Alexandra; MÖRS, Volker; SHIWAKU, Toshio; assigned: Ticona GmbH
40. US6368725: Issued April 9, 2002: Method for producing a coating powder composition, Graf, Knut; Simmrock, Hans-Ulrich; Jacobs, Alexandra; Mors, Volker; Ward, Bennett; assigned: E. I. du Pont de Nemours and Company
41. EP0991530A1: Published April 12, 2000: BARRIER COATING OF AN ELASTOMER AND A DISPERSED LAYERED FILLER IN A LIQUID CARRIER AND COATED COMPOSITIONS, PARTICULARLY TIRES: FEENEY, Carrie, A.; BALZER, Raymond, J.; FARRELL, Michele; GOLDBERG, Harris, A.; GRAH, Michael, D.; LU, Mengshi; STEINER, William, G.; TANNERT, Klaus; WARD, Bennett, C.; WINSTON, Paul, B.; Assignees: Herberts GmbH **and** MICHELIN RECHERCHE ET TECHNIQUE S.A.
42. EP0943658A1: Published September 22, 1999: SPHERICAL, DYABLE POLYESTER PARTICLES, PROCESS FOR THEIR PRODUCTION AND THEIR USE FOR HIGH RESOLUTION TONERS: WARD, BENNETT CLAYTON, DR.; WULF, STEFAN, DR.; SHIWAKU, TOSHIO; TIEN, TZE-PEI; YOON, HYON-NAM; EAST, ANTHONY; Assigned: TICONA GMBH
43. US5919536: Issued July 6, 1999: Biaxially oriented films containing layers of polyethylene naphthalate bibenzoate (PENBB) and process for the production of these films, Bennett, Cynthia; Kuhmann, Bodo; Ward, Bennett Clayton; Choe, E-Won; Flint, John Anthony; assigned: Mitsubishi Polyester Film GmbH

44. WO9856861A1: Published December 17, 1998: AQUEOUS COATING COMPOSITION OF A POLYMER AND EXFOLIATED PLATELET FILLER: FEENEY, Carrie, A.; FARRELL, Michele; McCAULLEY, James, A.; HUBBARD, Michael, A.; GOLDBERG, Harris, A.; LU, Mengshi; WARD, Bennett, C.; assigned: MICHELIN RECHERCHE ET TECHNIQUE S.A.
45. US5801269: Issued Sept 1, 1998: Processes for crystallizing 4, 4'-dimethyl bibenzoate (DMBB) recovered from polyester byproduct streams, : Feeney, Carrie A.; Jones, Ida L.; Ward, Bennett C, Kenesson, Thomas M.; Hilton, Charles B.; Ahern, Michael R.; Adams, Gregory M.; de la Garza, Edward M.; Wood, Jr., B. Frank; Grantland, Thomas L.; Tsai, Kan J.; Ragan, James L.; assigned Hoechst Celanese Corp.
46. EP 705863 A1, Published Apr 10, 1996, Two-stage melt polymerization process for making polybenzimidazoles with intermediate formation of friable prepolymer foam utilizing tetrazole blowing agents; Wolf, Arno E.; Ward, Bennett C.; Trotter, James C.; assigned Hoechst Celanese Corp.
47. US5139863: Issued August 18, 1992: Molded polybenzimidazole/polyaryleneketone articles and method of manufacture: Alvarez, Eduardo; DiSano, Lorenzo P.; Ward, Bennett C.; assigned: Hoechst Celanese Corporation
48. US5099039: Issued March 24, 1992: Production of THF from 1,4-butanediol using a polybenzimidazole catalyst, Schiraldi, David A.; Ward, Bennett C.; assigned: Hoechst Celanese Corp.
49. US5070153: Issued December 3, 1991: Molded polybenzimidazole/polyaryleneketone articles and method of manufacture: Alvarez, Eduardo; DiSano, Lorenzo P.; Ward, Bennett C.; assigned: Hoechst Celanese Corporation
50. US5041666: Issued August 20, 1991: Method for the production of 3,3',4,4'-tetraaminobiphenyl Ward, Bennett C.; Ray, Wilson B.; Hilton, Charles B.; East, Anthony J.; Davenport, Kenneth G.; assigned: Hoechst Celanese Corporation
51. US4912176: Issued March 27, 1990: Sintered polybenzimidazole/polyaryleneketone articles and method of manufacture: Alvarez, Eduardo; DiSano, Lorenzo P.; Ward, Bennett C.; assigned: Hoechst Celanese Corporation
52. US4861537: Issued August 29, 1989: Process of making a sintered polybenzimidazole article: Ward, Bennett C.; Alvarez, Eduardo; Blake, Ralph S.; assigned: Hoechst Celanese Corporation
53. US4814530: Issued March 21, 1989: Sintered polybenzimidazole article:: Ward, Bennett C.; Alvarez, Eduardo; Blake, Ralph S.; assigned: Hoechst Celanese Corporation, Alpha Precision Plastics
54. International SAMPE Technical Conference (1989), 21(Adv. Mater.), 782-95. Composite parts and prepregs containing polybenzimidazole (PBI) high polymer matrix resin, Ward, Bennett C.; Brown, Debra K.
55. International SAMPE Symposium and Exhibition (1989), 34(Tomorrow's Mater. Today, Book 2), 2420-8. Creep and hysteresis behavior of polybenzimidazole (PBI), Haimbach, Frank, IV; Ward, Bennett C.
56. SAMPE Journal (1989), 25(2), 21-5. Molded Celazole polybenzimidazole (PBI) resin: performance properties and aerospace-related applications, Ward, Bennett C.
57. International SAMPE Symposium and Exhibition (1988), 33(Mater.--Pathway Future), 146-57. Molded Celazole PBI resin: performance properties and aerospace-related applications, Ward, Bennett C.
58. US4717764: Issued January 5, 1988: Two stage melt polymerization process for making polymers containing aromatic amide groups: Ward, Bennett C.; assigned: Celanese Corporation
59. US4672104: Issued June 9, 1987: Two stage polybenzimidazole process and product: Ward, Bennett C.; assigned: Celanese Corporation

60. International SAMPE Symposium and Exhibition (1987), 32nd (Adv. Mater. Technol. '87), 795-806. Cure cycle optimization of compression-molded high-molecular-weight Celazole PBI resin, Harb, Mary E.; Treat, Jon W.; Ward, Bennett C.
61. International SAMPE Symposium and Exhibition (1987), 32nd (Adv. Mater. Technol. '87), 853-67. Effects of molecular weight and cure cycle on the properties of compression-molded Celazole PBI resin, Ward, Bennett C.
62. US4588808: Issued May 13, 1986: Two-stage process and product for producing polybenzimidazole from free dicarboxylic acids: Ward, Bennett C.; assigned: Celanese Corporation
63. US4506068: Issued March 19, 1985: Two stage high molecular weight polybenzimidazole production with phosphorus containing catalyst: Choe, Eui W.; Conciatori, Anthony B.; Ward, Bennett C.; assigned: Celanese Corporation
64. US4463167: Issued July 31, 1984: Two stage high molecular weight polybenzimidazole production with phosphorus containing catalyst: Choe, Eui W.; Conciatori, Anthony B.; Ward, Bennett C.; assigned: Celanese Corporation
65. Inorganic Chemistry (1981), 20(4), 1248-53. Oxotungsten(IV)-acetylene complexes: synthesis via intermetal oxygen atom transfer and nuclear magnetic resonance studies, Templeton, Joseph L.; Ward, Bennett C.; Chen, Grace J. J.; McDonald, John W.; Newton, William E.
66. Journal of the American Chemical Society (1981), 103(26), 7713-21, Role of ligand π -donation in electron-deficient organometallic Group VIB complexes, Templeton, Joseph L.; Winston, Paul B.; Ward, Bennett C.
67. Journal of the American Chemical Society (1981), 103(13), 3743-53. Seven-coordinate dicarbonyltriphenylphosphinebis(N,N-dialkyldithiocarbamate)tungsten(II) complexes. Molecular structure and dynamic properties, Templeton, Joseph L.; Ward, Bennett C.
68. Journal of the American Chemical Society (1980), 102(9), 3288-90. Carbon-13 chemical shifts of alkyne ligands as variable electron donors in monomeric molybdenum and tungsten complexes, Templeton, Joseph L.; Ward, Bennett C.
69. Journal of the American Chemical Society (1980), 102(21), 6568-9. Molecular structure of $\text{Mo}(\text{CO})_2[\text{S}2\text{CN}-i\text{-Pr}_2]_2$. A trigonal-prismatic electron-deficient molybdenum(II) carbonyl derivative, Templeton, Joseph L.; Ward, Bennett C.
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71. Inorganic Chemistry (1980), 19(6), 1753-9. Seven-coordinate tricarbonylbis(N,N-dialkyldithiocarbamate)tungsten(II) complexes. Molecular structure and dynamic properties, Templeton, Joseph L.; Ward, Bennett C.
72. PhD Dissertation, UNC Chapel Hill, December 1980. Six- and seven-coordinate tungsten(II) and molybdenum(II) carbonyl dithiocarbamate complexes, Ward, Bennett Clayton