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Curriculum Vitae

DONALD N. SCHULZ. Ph.D.



Mr. Schulz is an Associate of Causey Engineering, LLC. Causey Engineering has for over 25 years been providing forensic and investigative engineering services and litigation support, specializing in industrial and construction engineering, operations, safety, patents, and regulations. Mr. Schulz has particular experience in the field of polymers and organic chemistry.

Education:

University of Massachusetts

Ph.D., Organic Chemistry, 1971

State University of NY at Buffalo

B.A., Chemistry, 1965

NY State Regents College Scholarship

SUNY-Buffalo Scholarship

Honors/Awards:

CUMIRP Lecturer - University of Massachusetts, Center for UMass / Industry Research on Polymers, 1991

Fellow - ACS PMSE Division, 2005 - Present

Fellow - American Institute of Chemists, 1983 - Present

Listed in American Men and Women of Science, 1982 - Present

Member - Sigma Xi, 1990 - Present

Peer Recognition Award for Management and Leadership - Exxon Chemical Co., 1989

Golden Tiger Award for Teamwork - Exxon Research and Engineering, 1998

Global Marketing Award - ExxonMobil Chemicals, 2006

Patents:

Inventor/Co-inventor over 60 U. S. patents. Complete list is attached. The majority of these 60+ patents relate to polymer synthesis, characterization, and properties of polymers (e.g. elastomers, plastics, water soluble and gellable polymers, lubes) and complex fluids.

Work Experience:

Causey Engineering LLC, Austin, TX

2011 to Present

Forensic Expert: Provide Forensic and investigative work related to Polymer Consulting. Causey Engineering provides engineering analysis, governmental regulation investigation and research, accident reconstruction and litigation support primarily related to oil and gas, refineries, chemical and petrochem plants, central power stations, electronic manufacturing, food processing, pulp and paper, lumber manufacturing, industrial construction, and warehousing.

ExxonMobil Research and Engineering Co., Annandale, NJ

1990 - Present

- 2008-Present *Sr. Scientific Advisor Emeritus and Polymer Consultant.*
- 2007-2008 *Sr. Scientific Advisor (Executive Level):* Led new initiatives in polymers for sustainable development and polymers for alternate energy.
- 2005-2007 *Section Head, Sr. Scientific Advisor (Executive Level):* Managed a group (ca. 35 people) developing new organic materials (plastics, elastomers, and lubes).
- 2002-2005 *Sr. Scientific Advisor (Executive Level):* Led a new strategic initiative for Corporate Strategic Research aimed at breakthrough business/technology for ExxonMobil Chemicals.
- 1999-2002 *Scientific Advisor (Executive Level):* Leading a group (ca. 10 people) developing new late transition metal and main group polymerization catalysts and evaluating advantaged feedstocks for polymers.
- 1996-1999 *Program Leader/Sr. Res. Associate:* Initiated, organized, and led a high performance U.S. team that commercialized a new global diesel fuel additive. Led groups (ca. 15 people) developing new organometallic polymerization catalysts and new polymer additives for fuels.
- 1993-1996 *Section Head/Sr. Research Associate:* Managed a section (ca. 40 professionals and technicians) involved in nanocomposite technology, polyolefin structure-property relationships, gas hydrate inhibition, and fuel/lube additives.
Section Head - over the commercialization of new family of polyolefin processing aids.
- 1993 *Acting Lab Director, Polymers and Complex Fluids Lab:* Managed the Polymers and Complex Fluids Laboratory (ca. 75 people) during phased-out and reorganization.
Member of VP Panel - that evaluated commercialization strategy for metallocene polymer venture.
- 1990-1993 *Section Head/Sr. Research Associate:* Managed a section (ca. 30 professionals and technicians) involved in fundamental and exploratory studies in polymer synthesis of novel hydrocarbon and water soluble

polymers, alloys, blends, composites, encapsulation, and polymer surface modification and analysis.

Section Head - over the commercialization of polymer coated fertilizer.

Elastomer Technology Division. Exxon Chemical Co., Linden, NJ 1986 – 1989

Section Head/Sr. Research Associate: Managed the long range elastomer research group (ca.10 people), focusing on blocks, grafts, polymer blends; thermoplastic elastomers, and impact plastics. Managed the Polymer Characterization Laboratory (ca. 10 people)

Section Head - over the commercialization new tubular reactor technology for EP rubber

Corporate Research Laboratories, Exxon Research and Engineering Co.,
Annandale, NJ 1984 - 1986

Group Head/Sr. Research Associate: Led group of professional chemists and technicians (ca. 8 people) involved in the synthesis, characterization, and solution property evaluation of novel functional hydrocarbon and water soluble polymers. Co-invented polymer additives for safety fuels for jet aircraft. Co-invented shear-stable drag reducing agents.

Corporate Research Laboratories, Exxon Research and Engineering Co.,
Linden, NJ 1981 - 1984

Group Head/Research Associate: Built and directed a new group (ca. 8 chemists and technicians) in water soluble polymer R&D. Co-invented water soluble polymers for chemically enhanced oil recovery.

Central Research Laboratories, Firestone Tire & Rubber Co.,
Akron, OH 1971 - 1981

1975-1981 *Group Leader:* Led group (ca. 8 professional chemists and technicians) engaged in synthetic polymer/organic research and development. Managed the Research Reactor Room (18 bench scale reactors, 0.5-5 gal. Scale). Served as liaison to Firestone Synthetic Rubber Co. Co-invented powdered rubber technology that was carried through tire development.

1971-1975 *Research Scientist:* Co-invented the first protected functional anionic initiators, which were later improved and commercialized by the University of Akron and the LITHCO Co.

Teaching/Academic Experience:

Cornell University - Lecturer, "Polymer Synthesis" short course, 1992.

University of Southern Mississippi - Lecturer, "Water Soluble Polymers" short course, 1990-2003.

ExxonMobil Chemical Co. - Lecturer, "Polymer Technology" short course, 2000-Present.

Virginia Tech – Lecturer, "Future Industrial Professional in Science and Engineering", 2008-2011.

Virginia Tech - Lecturer, "Organic Chemistry of Polymers", 2009-2011

ACS Summer School on Green Chemistry - Lecturer, 2011.

Lehigh University - Thesis Committee, D. Hokien Carey (Prof. Ferguson) 1995.

CUNY - Thesis Committee, Y. Yang (Prof. Steiner) 1998.

University of Massachusetts - Thesis Committee, (unofficial), M. Pyati (Prof. Lillya) 1996.

Editorial / Advisory Boards:

Rubber Reviews - Chairman, Editorial Board, 1990-1992.

Rubber Reviews - Editorial Board, 1985-1992.

Rubber Chemistry & Technology, - Associate Editor, 1984-1997.

Heteroatom Chemistry - Editorial Board, 1988-1996;

**Polymer/Composite Characterization of Journal Macromolecular
Science-Chemistry** - Advisory Board, 1987.

Isotopics - Editor, 1980.

Isotopics - Assistant Editor, 1979.

Rutgers University - Advisory Board, Department of Chemistry, 2009-Present.

Virginia Tech - Advisory Board, Macromolecules and Interfaces Institute, 2006-2008.

Lehigh University, NSF Consortium of Complex Fluids - Advisory Board, 1992.

Professional Activities / Memberships:

ACS (American Chemical Society), Member 1965 -Present

ACS Division of Polymeric Materials - Science and Engineering (PMSE) - Chairman, 1996; Chair-Elect, 1996; Vice-Chair 1995; Treasurer, 1991-1994; Program Chair 1988-1990; Executive Committee, 1986-Present.

ACS Macromolecular Secretariat - Secretary General, 2000;

ACS Petroleum Research Fund (PRF) - Advisory Board, 2005-Present.

National ACS Meetings - Symposium Co-Chairs, 1986, 1989, 1991, 1993, 1997, 1999, 2000.

ACS Akron Section - Public Relations Chairman, Program Committee, Nominations and Awards Committee, 1977.

ACS 8th Central Regional - Meeting Committee, 1976.

Gordon Research Conferences - Chair, "Elastomers, Networks and Gels", 2003; vice chair, 2001.

Gordon Research Conferences - "Ion Containing Polymers", Chair, 1993, Vice-Chair 1991.

Akron Polymer Lecture Group – Chair, 1978-79; Program Chair 1977-78; Treasurer 1976-77

Presentations, Publications:

Editor/Co-editor 6 books; Author/Co-author over 80 publications; Speaker at over 80 conferences, universities, workshops, etc. (Complete list is attached.)

Forensic Experience:

Active involvement in the prosecution of own 60+ patents; one case involved US Patent Interference proceedings. Served on Exxonmobil patent strategy committees; crafted patent strategies. Gave depositions in a management – labor arbitration.

Use of this CV is prohibited until we have a mutually signed agreement concerning your engagement of Causey Engineering LLC. Pending such, the use of our name is also prohibited, and we reserve the right to accept assignment by others in lieu of your firm.

DONALD N. SCHULZ, Ph.D.

List of Patents, Books and Publications

U.S. PATENTS

A. F. Halasa and D. N. Schulz, "Alkali Metal Aliphatic and Aromatic Hydrocarbon Acetals and Ketals and Their Use as Polymerization Initiators", **U.S. Patent 3,862,100 (January 21, 1975)**.

D. N. Schulz and J. N. Anderson, "Increasing the Molecular Weight of Liquid Linear Butadiene and Dead Polymers Employing *p*-Toluene Sulfonic Acid as Acid Catalyst", **U.S. Patent 3,954,885 (May 4, 1976)**.

D. N. Schulz, "Dry Blendable Solution Rubber Powders and Process", **U.S. Patent 4,032,501 (June 28, 1977)**; **Belgium Patent 843,750 (January 3, 1977)**; **South African Patent 76/3956 (September 7, 1977)**.

D. N. Schulz and A. F. Halasa, "Protected Amino Functional Initiators and Amino Terminated Polymers and Their Production", **U.S. Patent 4,015,061 (March 29, 1977)**.

A. F. Halasa and D. N. Schulz, "Alkali Metal Aliphatic and Aromatic Hydrocarbon Acetals and Metals and Their Use as Polymerization Initiators", **U.S. Patent 4,052,370 (October 4, 1977)**.

A. F. Halasa, J. E. Hall, and D. N. Schulz, "Dehydrocarbyl Magnesium and Alkali Metal Compound Catalyst Composition for Polymerizing Conjugated Dienes", **U.S. Patent 4,139,490 (February 13, 1979)**.

D. F. Lohr, R. W. Koch, and D. N. Schulz, "Stabilization of Polyphosphazene Vulcanizates with Metal Complex", **U.S. Patent 4,139,523 (February 13, 1979)**.

D. N. Schulz and P. D. Trivedi, "Graft Copolymers Containing Polyoxazoline and Polyoxazine and the Preparation Thereof", **U.S. Patent 4,143,100 (March 6, 1979)**.

A. F. Halasa, J. E. Hall, and D. N. Schulz, "Process for Polymerizing Conjugated Dienes", **U.S. Patent 4,174,431 (November 13, 1979)**.

D. N. Schulz and J. W. Kang, "Polyphosphazene Polymers Containing Substituents Derived from Thieryl Alcohols", **U.S. Patent 4,223,103 (September 16, 1980)**.

D. N. Schulz and P. D. Trivedi, "Graft Copolymers Containing Polyoxazoline and Polyoxazine and the Preparation Thereof", **U.S. Patent 4,226,956 (October 7, 1980)**.

D. N. Schulz, J. W. Kang, and J. W. Spiewak, "Process for Preparing Poly(Organophosphazenes) from Soluble or Gelled Poly(Dichlorophosphazenes)", **U.S. Patent 4,226,972 (October 7, 1980)**.

D. N. Schulz, T. C. Chung, and T. A. Antkowiak, "Polyphosphazene Polymers Containing Monoethoxy and Polyethoxy Substituents", **U.S. Patent 4,258,173 (March 24, 1981)**.

B. Gunesin, G. R. Hamed, J. W. Kang, and D. N. Schulz, "Thermally Reversible Copolymers and Process for the Preparation Thereof", **U. S. Patent 4,307 210 (1981)**.

B. Gunesin, G. R. Hamed, J. W. Kang, and D. N. Schulz, "Thermally Reversible Copolymers and Process for the Preparation Thereof", **U.S. Patent 4,307,897 (December 28, 1982)**.

B. Gunesin, G. R. Hamed, J. W. Kang, and D. N. Schulz, "Thermally Reversible Copolymers and Process for the Preparation Thereof", **U.S. Patent 4,366,291 (December 28, 1982)**.

B. Guensin, G. R. Hamed, J. W. Kang, and D. N. Schulz, "Thermally Reversible Copolymers and Process for the Preparation Thereof", **U.S. Patent 4,373,068 (February 8, 1983)**.

D. F. Lohr and D. N. Schulz, "Molecular Weight Distribution and Microstructure Modifiers for Elastomers", **U.S. Patent 4,424,323 (January 3, 1984)**.

D. F. Lohr and D. N. Schulz, "Molecular Weight Distribution and Microstructure Modifiers for Elastomers", **U.S. Patent 4,451,576 (May 29, 1984)**.

D. N. Schulz, J. J. Maurer, and J. Bock "Process for the Formation of Novel Acrylamide Acrylate Copolymers", **U.S. Patent 4,463,151 (July 31, 1984)**.

D. N. Schulz, J. J. Maurer, and J. Bock, "Acrylamide Acrylate Copolymers", **U.S. Patent 4,463,152 (July 31, 1984)**.

J.E. Hall and D. N. Schulz, "Catalyst System Containing an Anionic Initiator Based on Lithium and Phosphine Oxide Modifier", **U.S. Patent 4,476,240 (October 9, 1984)**.

J. C. Newlove, R. C. Portnoy, D. N. Schulz, and K. Kitano, "Fluid Loss Control in Oil Field Cements", **U.S. Patent 4,480,693 (November 6, 1984)**.

D. N. Schulz, K. Kitano, T. J. Berkhardt, and A. W. Langer, "Drag Reduction Agent for Hydrocarbon Liquid", **U.S. Patent 4,518,757 (May 21, 1985)**.

I. Duvdevani, J. A. Eckert, D. N. Schulz, and K. Kitano, "Antimisting System for Hydrocarbon Fluids", **U.S. Patent 4,523,929 (June 18, 1985)**.

J. E. Hall and D. N. Schulz, "Process for Production of Polymers Having Increased 1,2-Microstructure", **U.S. Patent 4,537,939 (August 27, 1985)**.

D. N. Schulz, R. M. Kowalik, J. Bock, and J. J. Maurer, "Drag Reduction Agent", **U.S. Patent 4,546,784 (October 15, 1985)**.

D. N. Schulz, D. G. Peiffer, R. M. Kowalik, and J. J. Kaladas, "Drag Reduction Agent", **U.S. Patent 4,560,710 (December 24, 1985)**.

J. J. Maurer, D. N. Schulz, and J. Bock, "Improved Process for the Formation of Novel Acrylamide Acrylate Copolymers", **U. S. Patent 4,571,926 (April 1, 1986)**.

J. J. Kaladas and D. N. Schulz, "Cyclopolymerizable Sulfobetaine Monomer", **U.S. Patent 4,585,646 (April 29, 1986)**.

I. Duvdevani, J. A. Eckert, D. N. Schulz and K. Kitano, "Antimisting System for Hydrocarbon Fluids", **U.S. Patent 4,586,937 (May 6, 1986)**.

I. Duvdevani, D. N. Schulz, K. Kitano, and D. G. Peiffer, "Acid Base Interacting Polymer Solutions", **U.S. Patent 4,599,377 (July 8, 1986)**.

D. N. Schulz and K. Kitano, "Betaine Copolymers - Viscosifiers for Water and Brine" **U.S. Patent 4,607,076 (August 19, 1986)**.

I. Duvdevani, D. N. Schulz, K. Kitano, and D. G. Peiffer, "Acid Base Interacting Polymer Solutions", **U.S. Patent 4,621,111 (November 4, 1986)**.

R. M. Kowalik, I. Duvdevani, K. Kitano, and D. N. Schulz, "Drag Reduction Agents for Hydrocarbon Solutions", **U. S. Patent 4,625, 745 (December 2, 1986)**.

D. N. Schulz, I. Duvdevani, J. Bock, and E. Berluche, "Terpolymers of Acrylamide, Alkylacrylamide and Betaine Monomers", **U. S. Patent 4,650,848 (March 17, 1987)**.

D. N. Schulz, E. Berluche, J. J. Maurer, and J. Bock, "Tetrapolymers of N-Vinyl Pyrrolidone/Acrylamide/Salt of Acrylic Acid/N-Alkylacrylamide", **U. S. Patent 4,663,408 (May 5, 1987)**.

J. J. Kaladas and D. N. Schulz, "Cyclopolymerizable Sulfobetaine Monomer", **U.S. Patent 4,708,998 (November 24, 1987)**.

J. Bock, S. J. Pace, and D. N. Schulz, "Enhanced Recovery with Hydrophobically Associating Polymers containing N-Vinyl-Pyrrolidone Functionality", **U.S. Patent 4,709,759 (December 1, 1987)**.

K. Kitano, I. Duvdevani, and D. N. Schulz, "Method for Controlling Viscosity of Organic Liquids and Compositions", **U.S. Patent 4,715,865 (December 29, 1987)**.

D. N. Schulz, I. Duvdevani, J. Bock, and E. Berluche, "Terpolymers of Alkylacrylamide, and Betaine Monomers", **U.S. Patent 4,742,135 (May 3, 1988)**.

D. N. Schulz, I. Duvdevani, J. Bock, and J. Kaladas, "Terpolymers of Acrylamide Alkylpolyethoxyacrylate and Betaine Monomers", **U.S. Patent 4,788,247 (November 29, 1988)**.

D. N. Schulz, E. Berluche, J. J. Maurer, and J. Bock, "Novel Acrylamide Acrylate Copolymers", **U.S. Patent 4,792,593 (December 20, 1988)**.

D. N. Schulz and J. J. Kaladas, "Method of Increasing Viscosity of an Aqueous Solution with Sulfo Betaine Polymer", **U.S. Patent 4,822,847 (April 18, 1989)**.

K. Kitano, I. Duvdevani, and D. N. Schulz, "Method for Controlling the Viscosity of Organic Liquid and Composition", **U.S. Patent 4,880,436 (November 14, 1989)**.

D. N. Schulz, I. Duvdevani, J. Bock, and E. Berluche, "Terpolymers of Acrylamide, Alkylacrylamide, and Betaine Monomers", **U.S. Patent 4,882,405 (November 21, 1989)**.

Y. Fujita, D.N. Schulz, W.Y. Chow, J. Horrión, T. Ouhadi, R.G. Austin, A.A. Montagna, K. O. McElreath, J. Audett, "Crystalline Polyolefin Graft Copolymers," **U.S. Patent 5,130,371 (July 14, 1992)**.

D.N. Schulz, K. Kitano, "Betaine-Copolymers-Viscosifiers for Water and Brine," **U.S. Patent 5,153,298 (October 6, 1992)**.

W.A. Thaler, D.W. Brownawell, D.N. Schulz, J. Wagensommer, J.B. Gardiner, "Polymeric Amides for MFVI's" **U.S. Patent 5,156,758 (October 20, 1992).**

C. A. Costello, P. J. Wright, D. N. Schulz, J. A. Sissano, "Gaseous Hydrogen-Free Hydrogenation Process for Unsaturated Polymers" **U.S. Patent 5, 399,632 (1994).**

R. T. Stibrany, D. N. Schulz, S. Kacker, A. O. Patil, "Catalyst Complexes and Polymers Therefrom" **U.S. Patent 6,037,297.(March 14, 2000).**

A. O. Patil, D. N. Schulz, R. A. Cook, M. G. Matturro, " Parafin-Soluble Polymers and Copolymers", **U.S. Patent 6,156,872 (December 5, 2000).**

R. T. Stibrany, D. N. Schulz, S. Kacker, A. O. Patil, "Substantially Linear Copolymers", **U.S. Patent 6,417,303 (July 9, 2002).**

A.O. Patil, R. T. Stibrany, S. Zushma, E. Berluce, D.N.Schulz, "Polymerization Using Late Transition Metal Complexes Formed *In-Situ*", **U.S. Patent 6, 506,859 (January 14, 2003).**

A.O. Patil, D. N. Schulz, R A. Cook, M.G. Matturro, "Polymerization Process for Using Dilute Multicomponent Feeds", **U.S. Patent 6, 541,586 (April 1, 2003).**

A. O. Patil, D. N. Schulz, M. Matturro, R. H. Schlosberg, "Use of Carbon Monoxide Containing Polymers as Adhesive Additives, and Fluids", **U.S. Patent 6,573,226 (June 3, 2003).**

A. O. Patil, D. N. Schulz, M. Matturro, R. H. Schlosberg, "Use of Carbon Monoxide Containing Polymers as Adhesive Additives, and Fluids", **U.S. Patent 6,573,226 (January 13,2004).**

A. O. Patil, D. N. Schulz, R. A. Cook, M. G. Matturro," Non-Linear Polymer Product Derived from Dilute Multicomponent Feeds", **U.S. Patent 6,740,718 (May 25, 2004).**

A. O. Patil, D. N. Schulz, M. Varma-Nair, D. Lohse, C. Costello, R. Schlosberg, M. G. Matturo, " Polyvinyl Chloride Resins", **U.S. Patent 6,750,278 (June 15, 2004).**

L. S. Boffa, A. O. Patil, D. N. Schulz, R. T. Stibrany, J. A. Sissano, S. Zushma, "Multi-Dentate Late Transition Metal Catalyst Complexes and Polymerization Methods Using Those Concepts", **U.S. Patent 6, 809,058 (October 26, 2004).**

L. S. Boffa, A. O. Patil, D. N. Schulz, R. T. Stibrany, J. A. Sissano, S. Zushma, "Multi-Dentate Late Transition Metal Catalyst Complexes and Polymerization Methods Using Those Concepts", **U.S. Patent 6, 864,334 (March 8, 2005).**

A. O. Patil, D. N. Schulz, M. Varma-Nair, D. Lohse, C. Costello, R. Schlosberg, M. G. Matturo, " Polyvinyl Chloride Resins", **U.S. Patent 6,977,277 (December 12, 2005).**

L.S. Baugh, E. Berluce, P. V. Hinkle, F.C.Rix, D.N.Schulz, "Olefin Polymerization Catalyst for Polar Monomers", **U.S. Patent 7,479,531 (January 20, 2009).**

Books, Chapters, Papers, Preprints

W. E. McEwen, V. L. Kyllingstad, D. N. Schulz, and Y. Yeh, "Anchimeric Assistance in Reactions of Some Triarylphosphines with Benzyl Chloride", Phosphorous, 1, 145 (1971).

W. E. McEwen, G. H. Briles, and D. N. Schulz, "Preparation and Reactions of Triphenylstibine Oxide", Phosphorous, 2, 147 (1972).

D. N. Schulz, A. F. Halasa, and A. E. Oberster, "Anionic Polymerization Initiators Containing Protected Functional Groups and Functionally Terminated Polymers", ACS Polym. Prepr., 14 (2) 1215 (1973).

D. N. Schulz, A. F. Halasa, and A. E. Oberster, "Anionic Polymerization Initiators Containing Protected Functional Groups and Functionally Terminated Diene Polymers", J. Polym. Sci., A-1, 12, 153 (1974).

W. E. McEwen, W. T. Shiau, Y. Yeh, D. N. Schulz, R. W. Pagilagan, J. B. Levy, C. Symmes, G. Nelson, and I. Granth, "Chemical and Physical Consequences of 2p-3d Overlap in o-Anisylphosphines and o-Anisylphosphonium Salts", J. Am. Chem. Soc. 97, 1787 (1975).

W. E. McEwen, J. E. Fountaine, D. N. Schulz, and W. I. Shaiu, "Additional Evidence of a New Type of Anchimeric Assistance in the Quaternization Reactions of Phosphines and Arsines", J. Org. Chem., 41, (1976).

D. N. Schulz, L. E. Calihan, and D. P. Tate, "Solution SBR Powders", Rubber Chem. Technol., 49, 126 (1976).

D. N. Schulz and A. F. Halasa, "Anionic Polymerization Initiators Containing Protected Functional Groups, II", J. Polym. Sci., A-1, 15, 2401 (1977).

D. N. Schulz and D. P. Tate, "Copolymers", in Kirk-Othmer, Encyclopedia of Chemical Technology, 3rd Ed. Vol. 6, M. Grayson, Ed. Wiley-Interscience, New York, 1979, pp. 798-818.

D. N. Schulz, "Technical Obsolescence", Isotopics, 55, (10) 1 (1980).

D. N. Schulz, "Functionally Terminal Polymers via Anionic Methods", ACS Polym. Prepr., 21 (1), 32 (1980).

D. N. Schulz, NASA, Gov. Report NAS2-10755, "Development and Delivery of NASA Orbitread Compound", 1st Quarterly Report, December 22, 1980.

A. F. Halasa, D. N. Schulz, D. P. Tate, and V. D. Mochel, "Organolithium Catalysis of Olefin and Diene Polymerization", in Advances in Organometallic Chemistry, Vol. 18, F. Stone and R. West, Eds., Academic Press, New York, 1980, pp. 55-97.

P. D. Trivedi and D. N. Schulz, "Synthesis and Properties of Poly(Vinyl Chloride-g-2-Methyl-2-Oxazoline)", Polym. Bull. (Berlin), 3, 37 (1980).

D. N. Schulz, J. W. Speiwak, J. K. Valaitis, V. D. Mochel, and M. Barzan, "Acyclic Azoester Modification of 1,4- and 1,2-Polybutadienes. Structure Property Relationships", Macromolecules, 13, 1367 (1980).

- J. W. Spiewak, L. A. Bryant, and D. N. Schulz, "Acyclic Azoester Modification of 1,4-Polybutadienes. II. Green Strength and Tack Properties", J. Appl. Polym. Sci. **26**, 4331 (1981).
- D. N. Schulz, J. C. Sanda, and B. J. Willoughby, "Functionally Terminal Polymers via Anionic Methods", in Anionic Polymerization: Kinetics, Mechanism and Synthesis, ACS Symp. Series Vol. 166, J. E. McGrath, Ed., American Chemical Soc., Washington, D. C., 1981, Ch. 27.
- D. N. Schulz, S. R. Turner, and M. L. Golub, "Recent Advances in the Chemical Modification and Unsaturated Polymers", Rubber Chem. Technol. **55**, 809 (1982).
- B. G. Gunesin, G. R. Hamed, D. N. Schulz, J. W. Kang, and A. Cain, "Metal Coordinated Polymers and Their Physical Properties", Proc. IUPAC, I.U.P.A.C. Macromol. Symp. **28th**, 1982, 906.
- G. R. Hamed, C. H. Shieh, and D. N. Schulz, "Evidence of Strain-Induced Phase Separation in Isopropyl Azocarboxylate Polybutadiene", Polym. Bull. (Berlin), **9**, 525 (1983).
- W. W. Schulz, J. Kaladas, and D. N. Schulz, "Compositional and Molecular Weight Analysis of Polyether Macromonomers by Chromatographic Techniques", ACS Polym. Preprints, **25**, (1) 115 (1984).
- J. J. Maurer, D. N. Schulz, D. B. Siano, and J. Bock, "Thermal Analysis of Acrylamide-Based Polymers", in Analytical Calorimetry, Vol. 5, P.S. Gill, Ed., Plenum Press, 1984, pp. 43-56.
- B. Z. Gunesin, D. N. Schulz, J. W. Kang, A. R. Cain, and G. R. Hamed, "IBMA-Metal Containing Polymers", J. Polym. Sci. Chem. Ed. **22**, 353, (1984).
- W. W. Schulz, J. Kaladas, and D. N. Schulz, "Compositional and Molecular Weight Analysis of Polyether Macromonomers by Chromatographic Techniques", J. Polym. Sci., Chem. Ed., **22**, 3975 (1984).
- D. N. Schulz and D. P. Tate, "Copolymers", in Kirk-Othmer Concise Encyclopedia of Chemical Technology, M. Grayson, Ed., John Wiley, New York, 1985, pp. 315-316.
- G. Holzwarth, L. Soni, and D. N. Schulz, "Molecular Weight Distribution of Water-Soluble Polymers: A New Absolute Method", Macromolecules, **19** 422 (1986).
- D. N. Schulz, D. G. Peiffer, P. K. Agarwal, J. Larabee, J. Kaladas, L. Soni, B. Handwerker, and R. Garner, "Phase Behavior and Solution Properties of Sulfobetaine Polymers". Polymer, **27**, 1773 (1986).
- J. Bock, D. B. Siano, D. N. Schulz, S. R. Turner, P. L. Valint, Jr., and S. J. Pace, "Hydrophobically Associating Polymers", ACS Div. of Polym. Matl. Sci. & Eng. Prepr. **55(2)** 355 (1986).
- G. M. Hozworth, L. Soni, D. N. Schulz, J. Bock, "Absolute MWD's of Polyacrylamides by Sedimentation/LALLS", ACS Div. of Polym. Matl. Sci. & Eng. Prepr. **55 (2)** 511 (1986).
- D. N. Schulz, "Hydrogenation of Polymers", in Encyclopedia of Polymer Science and Engineering, Vol. 18, M. Grayson and J. I. Kroschwitz, Eds., Wiley-Interscience, John Wiley & Sons, New York, 1987 pp. 807-817.

D. N. Schulz, K. Kitano, J. A. Danik, and J. J. Kaladas, "Copolymers of NVP and Sulfonate Monomers-Synthesis and Properties", ACS Div. of Polym. Mat'l Sci. and Eng. Prepr. **57**, 149 (1982).

P. L. Valint, Jr. J. Bock and D. N. Schulz, "Synthesis and Characterization of Hydrophobically Associating Polymers", ACS Div. of Polym. Matl. Sci. & Eng. Prepr. **57**, 482 (1987).

D. G. Peiffer, D. N. Schulz, and M. W. Kim, "Associating-Type Polymers in Well-Defined Flow Field-Influence of Solvent Quality and Polymer Concentrations", J. Polym. Sci-Phys. Ed., 1615 (1987).

R. M. Kowalik, I. Duvdevani, D. G. Peiffer, R. D. Lundberg, K. Kitano, and D. N. Schulz, "Enhanced Drag Reduction via Interpolymers Complexes", J. of Non-Newtonian Fluid Mech., **24** 1 (1987).

D. N. Schulz, J. J. Kaladas, J. J. Maurer, J. Bock, S. J. Pace, and W. W. Schulz, "Copolymers of Acrylamide and Surfactant Macromonomers-Synthesis and Solution Properties", Polymer, **28**, 2110 (1987).

D. N. Schulz, "Chemical Modification of Synthetic Elastomers", in Handbook of Elastomers-New Development and Technology, A. K. Bhowmick and H. L. Stephens, Eds., Plenum Press, New York, 1988, pp. 75-100.

J. Bock, P. L. Valint, Jr., S. J. Pace, D. B. Siano, D. N. Schulz, and S. R. Turner, "Hydrophobically Associating Polymers", in Water Soluble Polymers for Petroleum Recovery, G. A. Stahl and D. N. Schulz, Eds., Plenum Press, New York, 1988, p. 145.

G. Holzworth, L. Soni, D. N. Schulz, and J. Bock, "Absolute MWD's of polyacrylamides by Sedimentation and Light Scattering", Water Soluble Polymers for Petroleum Recovery, G. A. Stahl and D. N. Schulz, Eds., Plenum Press, New York, 1988, p. 215.

G. A. Stahl and D. N. Schulz, Eds., Water Soluble Polymers for Petroleum Recovery, Plenum Press, New York, 1988.

T. C. Chung, M. Raate, E. Berluche, and D. N. Schulz, "Synthesis of Functional Hydrocarbon Polymers with Well-Defined Molecular Structures", Macromolecules, **21**, (7) 1903 (1988).

D. N. Schulz, K. Kitano, J. A. Danik, and J. J. Kaladas, "Copolymers of NVP and Sulfonate Monomers-Synthesis and Properties", in Polymers and Aqueous Media", ACS Symposium Series, J. E. Glass, Eds., 1989, Ch. 9.

P. L. Valint, Jr., J. Bock, and D. N. Schulz, "Synthesis and Characterization of "Hydrophobically Associating Polymers", in Polymer and Aqueous Media", ACS Symposium Series, J. E. Glass, Ed., 1989, Ch. 21.

C. L. McCormick, D. N. Schulz, and J. Bock "Water Soluble Polymers", in Encyclopedia of Polymer Science and Engineering, M. Grayson and J. I. Kroschwitz, Eds., Wiley-Interscience, John Wiley & Sons New York, 1989, Vol. 17, 730-784.

D. N. Schulz, K. Kitano, I. Duvdevani, J. Eckert, R. M. Kowalik, "Hydrocarbon Associating Polymers as Antimisting and Drag Reducing Agents", ACS Div. of Poly. Matl. Sci. & Eng. Prepr., **61**, 57 (1989).

D. N. Schulz, "Water Soluble Polymer Synthesis: Theory and Practice", ACS Div. of Polym. Chem. Prepr., **39**(2), 329 (1989).

D. N. Schulz, "Hydrogenation of Polymers" in Concise Encyclopedia of Polymer Science and Engineering, J. I. Kroschwitz, Ed. Wiley-Interscience, New York, 1990, pp. 459-460.

C. L. McCormick, J. Bock, and D. N. Schulz, "Water Soluble Polymers" in Concise Encyclopedia of Polymer Science and Engineering, J. I. Kroschwitz, ed., Wiley-Interscience, 1990, New York, pp. 1299-1306.

J. E. Glass, D. N. Schulz, C. R. Zukoski, "Polymers as Rheology Modifiers: An Overview" in Polymers as Rheology Modifiers ACS Symposium Ser. 462, D. N. Schulz and J. E. Glass, Eds., Am. Chem. Soc., Washington, D. C., 1991, Ch. 1.

D. N. Schulz, K. Kitano, I. Duvdevani, R. M. Kowalik, J. A. Eckert, "Hydrocarbon-Soluble Associating Polymers as Anitmisitng and Drag-Reducing Agents", in Polymers as Rheology Modifiers, ACS Symposium Ser. 462, D. N. Schulz and J. E. Glass, Eds., Am. Chem. Soc., Washington, D. C., 1991, Ch. 10.

D. N. Schulz and J. E. Glass, (Eds.) Polymers as Rheology Modifiers, ACS Symposium Ser. 462, Am. Chem. Soc., Washington, D. C., 1991.

D. N. Schulz, "Water Soluble Polymers: Theory and Practice", in Water Soluble Polymers, ACS Symposium Ser. 467, S. Shalaby, G. B. Butler, C. McCormick, Eds., Am. Chem. Soc., Washington, D. C. 1991, Ch. 3.

D. N. Schulz, J. Bock, J. Maurer, I. Duvdevani, and E. Berluche, "Associating Polymers with Hydrophobic and Zwitterionic Groups" ACS Division of Prepr. 32(1) 571 (1991).

D. N. Schulz, J. Bock, P. L. Valint, Jr., J. Maurer, S. R. Turner, I Duvdevani, and R. M. Kowalik, "Design of Aqueous (Brine) Rheology Modifiers" ACS Div. of Polymer Prepr. 32(2) 86 (1991).

D. N, Schulz and J. Bock "Synthesis and Fluid Properties of Associating Polymer Systems" J. Macromol. Sci.-Chem. A28(11 and 12), 1235 (1991).

T. C. Chung and D. N. Schulz, "Organoborane Mediated Synthesis of Functional Polymers-A Review", Heteroatom Chem., 2 (5), 545 (1991).

D.N. Schulz, J. Bock. P.L. Valint, Jr., J. Maurer, S.R. Turner, I. Duvdevani, R.M. Kowalik, "Design of Aqueous (Brine) Rheology Modifiers" ACS Polym. Prep. 32 (2) 86 (1991).

D.N. Schulz, J. Bock, J. Maurer, E. Berluche, J. Kaladas, I. Duvdevani, "Functional Water Soluble Polymers," Pacific Polym. Conf. Prepr. 2, 316 (1991).

D.N. Schulz, J. Bock, J. Maurer, E. Berluche, J. Kaladas, I. Duvdevani, "Functional Water Soluble Polymers," Progress in Pacific Polymer Science 2 - Proceedings of the 2nd Pacific Polymer Conference, Springer-Verlag, Heidelberg, Ger., 1992, p. 257-260.

N.P. Balsara, D.J. Lohse, J.A. Sissano, D.N. Schulz, W.W. Graessley, R. Krishnamoorti, "Thermodynamics of Random Copolymer Mixtures by SANS," ACS Div. Polym. Matl. Sci. Eng. Prepr. 67, 203 (1992).

C.A. Costello and D.N. Schulz, "Copolymers," in Kirk-Othmer Encyclopedia of Chemical Technology, 4th Ed., Vol. 7, J.I. Kroschwitz, Ed., Wiley-Interscience, New York, 1993, p. 349-381.

W.W. Graessley, R. Krishnamoorti, N.P. Balsara, L.J. Fetters, D.J. Lohse, D.N. Schulz, J.A. Sissano, "Effect of Deuterium Substitution of Thermodynamic Interactions in Polymer Blends", Macromolecules, 26, 1137 (1993).

K. Sakurai, W.J. MacKnight, D.J. Lohse, D.N. Schulz, J.A. Sissano, "Amorphous Crystalline Block Copolymer and Amorphous Homopolymer Blends I. A Preliminary Report," Macromolecules, 26, 3236 (1993).

D.J. Lohse, N.P. Balsara, L.J. Fetters, D.N. Schulz, J.A. Sissano and W.W. Graessley, R. Krishnamoorti, "Thermodynamics of Random Copolymer Mixtures by SANS", in New Advances in Polyolefin Polymers, T.C. Chung, Ed., Plenum, 1993, pp 175-183.

D.N. Schulz, J. Bock, and P.L. Valint, Jr., "Synthesis and Characterization of Hydrophobically Associating Water Soluble Polymers," in Soluble Polymer Complexes, P. Dubin, R. Davis, C. Thies, J. Bock and D. Schulz (Eds.), Springer-Verlag, Heidelberg, Ger., 1994, pp 3-13.

R. Varadaraj, J. Bock, and D. Schulz, "Solution Properties of Hydrophobically Associating Polymers," in Soluble Polymer Complexes, P. Dubin, R. Davis, C. Thies, J. Bock and D. Schulz (Eds), Springer-Verlag, Heidelberg, Ger., 1994, pp 33-50.

P. Dubin, R. Davis, C. Thies, J. Bock, D. Schulz, Eds., Soluble Polymer Complexes Springer-Verlag, Heidelberg, Ger., 1994.

W. W. Graessley, R. Krishnamoorti, N. P. Balsara, R. J. Butera, L. J. Fetters, D. J. Lohse, D. N. Schulz, J. A. Sissano, "Thermodynamics of Mixing for Blends of Model Ethylene-Butene Copolymers", Macromolecules, 27, 3896 (1994).

K. Sakurai, D. J. Lohse, D. N. Schulz, J. A. Sissano, M. Y. Lin, M. Agamalyan, W. J. MacKnight, "Crystallization Kinetics and Microdomain Structures for Blends of Amorphous-Crystalline Block Copolymers with Amorphous Homopolymers" in Ordering Macromol. Supt., Proc. OUMS '93, 1st A. Teramoto, M. Kobayashi, T. Norisuye, Eds., Springer, Berlin, Ger., 1994, pp 253-161.

D. N. Schulz, J. A. Sissano, C. A. Costello, "Ultrasound Assisted Preparation and Polymerization of Anionic Initiators", ACS Div. Of Polym. Chem., 35(2), 514 (1994).

K. Sakurai, W. J. Macknight, D. J. Lohse, R. T. Garner, D. N. Schulz, J. A. Sissano, "Blends of Amorphous-Crystalline Block Copolymers with Amorphous Homopolymers 2. Synthesis and Characterization of Poly (ethylene-propylene) Diblock Copolymer and Crystallation Kinetics for the Blend with Atactic Polypropylene", Macromolecules, 27, 4941 (1994).

D. N. Schulz, Ed. ACS Div. Of Polym. Matl. Sci. Eng. Prepr. 71(2) 1994.

W. W. Graessley, R. Krishnamoorti, N. P. Balsara, L. J. Fetters, D. J. Lohse, D. N. Schulz, J. A. Sissano, "Deuteration Effects and Solubility Parameter Ordering in Blends of Saturated Hydrocarbon Polymers", Macromolecules, 27, 2574 (1994).

W. W. Graessley, R. Krishnamoorti, N. P. Balsara, L. J. Fetters, D. J. Lohse, D. N. Schulz, J. A. Sissano, "Deuteration Effects and Solubility Parameter Ordering in Blends of Saturated Hydrocarbon Polymers", Macromolecules, 27, 3896 (1994).

D. N. Schulz, Ed. ACS Div. Of Polym. Matl. Sci. Eng. Prepr. 72(1) 1995.

K. Sakurai, W. J. Macknight, D. J. Lohse, D. N. Schulz, J. A. Sissano, J. S. Lin, A. Mikhail, "Blends of Amorphous-Crystalline Block Copolymers with Amorphous Homopolymers.

Morphological Studies by Electron Microscopy and Small Angle Scattering", Polymer, **37**, 4443 (1996).

K. Sakurai, W. J. Macknight, D. J. Lohse, D. N. Schulz, J. A. Sissano, W. Sedler, H. H. Winter, "Dynamic Viscoelastic Properties of Poly(ethylene-propylene) Diblock Copolymer in the Melt State and Solutions", Polymer, **37**, 5159 (1996).

D. N. Schulz, S. Datta, R. M. Waymouth, "Use of Protecting Groups in Polymerization", ACS Div. Of Polym. Matl. Sci. Eng. Prepr., **76(1)**, 3 (1997).

K. Sakurai, W. J. Macknight, D. J. Lohse, R. T. Garner, D. N. Schulz, J. A. Sissano, "Miscibility and Morphology of Polyolefin Blends and Block Copolymers", ACS Div. Of Polym. Matl. Sci. and Eng. Prepr. (1997).

J. Kaladas, R. Kastrup, D. N. Schulz, "Poly(cyclosulfobetaines) Synthesis, Characterization and Solution Properties", ACS Div. Of Polym. Chem. Prepr. **39(1)**, 619 (1998).

Y. Yang, D. N. Schulz, C. A. Steiner, "Physical Gelation of Hydrophobically Modified Polyelectrolytes. 1. Homogeneous Gelation of Alkylated Poly(acrylamide-co-Sodium Acrylate)", Langmuir, **15**, 4335 (1999).

N. Hadjichristidis, M. Xenidou, H. Iatrou, M. Pitsikalis, Y. Poulos, A. Averopoulos, S. Stella, S. Paraskeva, G. Velis, D. J. Lohse, D. N. Schulz, L. J. Fetters, P. J. Wright, R. A. Mendelson, C. A. Garcia-Franco, T. Sun, C. J. Ruff, "Well Defined, Model Long Chain Branched Polyethylene 1. Synthesis and Characterization", Macromolecules **33(7)** 2424 (2000).

D. J. Lohse, D. N. Schulz, S. T. Milner, L. J. Fetters, P. J. Wright, N. Hadjichristidis, H. Iatrou, M. Pitsikalis, Y. Poulos, A. Averopoulos, S. Sioula, S. Paraskeva, G. Velis, R. A. Mendelson, C. A. Garcia-Franco, M. K. Lyon, T. Sun, C. J. Ruff, "Use of Well Defined Models of Polyethylene to Determine the Effects of Long Chain Branching on Rheology", ACS Div. Polym. Mater. Sci. Eng. Prepr. **82**, 123 (2000).

S. Kacker, J. A. Sissano, D. N. Schulz, "Synthesis and Properties of Copolymers of Ethylene/Carbon Monoxide and Styrene/Carbon Monoxide", J. Polym. Sci. Part A. Polym. Chem. **38** (4), 752 (2000).

D. N. Schulz, A. O. Patil, "Chemical Modification of Synthetic Elastomers" in Handbook of Elastomers(2nd Edition), 2001, Plenum, NY, pp. 109-131.

R. T. Stibrany, D. Schulz, S. Kacker, A. O. Patil, L. S. Baugh, E. Berluche, J. A. Sissano, "Cu Catalysts for Homo- and Copolymerization of Olefins and Acrylates", ACS Div. Polym. Mat. Sci. Eng. Prepr. **86**, 325 (2002).

R. T. Stibrany, D. Schulz, S. Kacker, A. O. Patil, L. S. Baugh, E. Berluche, J. A. Sissano, "Cu Catalysts for Homo- and Copolymerization of Olefins and Acrylates", Macromolecules **36** (23), 8584 (2003)

R. T. Stibrany, D. N. Schulz, S. Kacker, A. O. Patil, L. S. Baugh, S. P. Rucker, S. P. Zushma, E. Berluche, J. A. Sissano, "Cu Catalysts for Homo- and Copolymerization of Olefins and Acrylates" ACS Symposium Series, "Beyond Metallocenes" **857**, 222 (2003)

L. S. Baugh, J. A. Sissano, S. Kacker, E. Berluche, R. T. Stibrany, D. N. Schulz, S. P. Rucker, "Fluorinated and Ring Substituted Bis-benzimidazole Copper Complexes Ethylene Acrylate Polymerization", J. Polym. Sci. Part A, Polym. Chem. **44** (6), 1817 (2006).