

VP OF R&D / TECHNICAL DIRECTOR / PROGRAM MANAGER

Innovation / Global R&D Operations / Intellectual Property / Chemical & Process Engineering / Product Development / Continuous Process Improvement / Commercialization / ISO9000 / Project Management / Knowledge Management / Patents / Trade Secrets / Budgets / SPC / Environmental Health & Safety / Client Relations / Supplier Management / OSHA / SPC / TQM / Best Practices / SWOT Analysis / Testing / Validation / Compliance / Experimental Design / Hazmat / Risk Management / Manufacturing / Facilities / Team Building / Staff Development / Pilot Plants / Corporate-Academic Partnerships / Green Processes

An innovative R&D leader, I have an outstanding record of accomplishment in the chemical industry developing, commercializing and constantly refining top-selling products. Leading research and development operations and teams, my efforts have successfully grown R&D pipelines with breakthrough discoveries and product portfolios with game-changing offerings at **Scientific Design Inc.**, **Sud-Chemie / United Catalysts Inc.** (now known as **Clariant**) and **Air Products & Chemicals Inc.**

Well versed in inorganic, organic, polymer and organometallic chemistry and recognized as an expert in catalysis, I have been instrumental in accelerating R&D lifecycles while churning out novel new solutions to meet challenging requirements for a wide variety of industrial applications and clients.

Experienced in joint ventures and collaborations, most recently, at the **University of Kansas Center for Environmentally Beneficial Catalysis**, I forged valuable strategic industry-academic R&D alliances that have resulted in exciting new product and process developments and patentable intellectual property.

At your organization, I could make a strong impact by:

- Maximizing returns on R&D investments
- Providing nimble change management leadership
- Driving nonstop innovation & continuous improvements
- Translating R&D breakthroughs into commercial successes
- Aligning product & processes with evolving client requirements
- Carefully guarding intellectual property, trade secrets & know-how
- Cost effectively meeting demanding customer product specifications
- Ensuring superior levels quality, manufacturability, reliability & safety
- Reengineering processes & systems to boost productivity & efficiency
- Forging valuable commercial & academic partnerships & strategic alliances
- Planning & completing complex projects with strict time & budget constraints
- Assembling, mentoring & motivating high performance multidisciplinary teams

Others have described me as a natural leader, visionary innovator, intuitive problem solver and penetrating analyst. A strong relationship builder, persuasive communicator and trusted business partner, I am known for building profitable strategic alliances and potent organizational synergies.

Holder of 33 patents (with others pending) and author of 26 papers in peer-reviewed journals. My education and training includes **PhD in Chemistry**, *Warsaw University of Technology*, **Post-Doc in Organometallic Chemistry**, *Tulane University*, **Research Fellow in Chemistry**, *Australian National University*, **Research Associate in Chemistry**, *University of California Santa Barbara* and **Master of Science in Chemical Process Technology**, *Warsaw University of Technology*.

CAREER HISTORY & SELECTED HIGHLIGHTS

Industry Liaison Director, Center for Environmentally Beneficial Catalysis (CEBC), University of Kansas, 2014-2016. Recruited to develop and manage valuable relationships with chemical industry partners and sponsors. Directed numerous programs, including IP and marketing of new R&D discoveries. Mentored graduate students and post-docs. Notable contributions include:

Forged synergistic university-corporate partnerships. CEBC was looking for new commercial alliance project opportunities. Conducted extensive outreach to R&D and other chemical industry executive leaders, courting potential partners. Attended a wide variety of conferences. Delivered presentations on new environmentally friendly catalysis process under development at CEBC. Enlisted a number of industry leaders to participate in new research, IP and commercialization programs. Secured valuable funding and support.

Instituted commercial safety standards at an academic lab. Industry partners were concerned about lax laboratory safety protocols at CEBC. Drawing on vast experience in corporate environments, developed, implemented and promoted commercial Best Practices at CEBC labs. Leveraged the new levels of safety to encourage new and expanded partnerships, sponsorships and joint projects.

Initiated revamping of IP policies, to increase sponsor satisfaction, ROIs and participation. The University of Kansas claimed sole ownership of all IP flowing from research at its facilities regardless of the sources of funding. Recognized the restrictive IP policy was scaring off potential corporate members, partners and sponsors at CEBC, launched a project to reevaluate the rule. Modeled a new policy proposal after those used at other prominent academic institutions, allowing for industry ownership of IP generated by corporate-funded projects. Encouraged greater participation and funding from new and existing industry partners.

Director, Research & Development, Scientific Design Inc. (SDI), 2004-2014. Recruited to build a new R&D operation as a part of joint venture between *Saudi Basic Industries* and *Sud-Chemie*. Reengineered the Department, trained and mentored a multidisciplinary team, directing development of new ethylene oxide catalysis processes and products. Played a key role in intellectual property protection efforts. Managed budgets to \$10M and staff to 27. Key accomplishments include:

Revitalized R&D, helping to quadruple catalyst sales. To counter eroding market share, SDI was desperate for an improved EO catalyst. Recruited to help stem the sagging sales, reviewed the existing R&D pipeline and identified leads ripe for commercialization. Restructured the research team, systems and processes to accelerate development and testing. Proved and rolled out a game-changing new EO catalyst product in less than 12 months. Restored SDI's technical leadership in the segment enabling a quadrupling category sales and adding several million dollars to the bottom line in less than two years.

More than doubled revenues with a new EO catalyst formulation. SDI needed a new high-selectivity ethylene oxide catalyst. Recognizing that a competitor's patent was nearing expiration, led an aggressive program to develop a new composition to fill the void. Directed every phase of the process, from discovery, lab and pilot plant validation to client site installation. Developed several alternatives to maximize chances of success, with first one ready for go-to-market immediately on expiration of the competitor's patents. Secured 10 US patents and extensive trade secrets/know-how. The new catalysts quickly became the SDI's top seller. Grew overall catalyst sales 50%. Added tens of millions in new revenue, ensuring long-term viability of SDI's catalyst business.

Diversified supply chain, cutting risks & saving millions. With carrier/support material costs as the biggest expense in catalyst production, saw reliance on a single supplier as a business and technical threat to SDI. Identified and conducted extensive testing to validate the suitability of alternative suppliers. Selected the vendor best equipped to meet both SDI's chemical and business requirements. Leveraged the competitive environment to maintain or improve quality while slashing costs by up to 33%.

Strengthened IP practices, avoiding costly litigation. Increasing litigiousness in the EO catalyst arena posed significant risks to SDI. Seeing that intellectual property practices needed strengthening, recommended engaging a leading NYC patent law firm. Working closely with corporate leadership and the new counsels, developed robust new processes, including ongoing monitoring and quarterly reviews of all IP. Established rigorous protections for all potentially valuable IP while avoiding any legal challenges.

Solved a raw material & production quality problem overnight. A catalyst product at an SDI manufacturing plant was out of specification. Stepped in to halt production. Assembled an R&D task force to track down the source of problem. Identified a flawed raw material as the root cause. Working with the supplier corrected the out of spec material and resumed production with only one lost shift. Avoided hundreds of thousands of dollars of potential lost productivity, deficient output and costly customer returns.

Global New Technology/R&D Coordinator, Sud-Chemie/United Catalysts Inc. (SCI-UCI; now Clariant), 1999-2004. Promoted to direct development, evaluation, testing, commercial and rollout of innovative new catalysis solutions for Houdry, styrene and selective hydrogenation processes and products. Drove continuous improvements to existing catalyst product lines. Instrumental in IP protection efforts. Managed dozens of projects in the US, Germany and Japan, budgets to \$3M and staff to 22. Previously, **R&D Lab Manager.** Significant achievements include:

Developed innovative testing to sharpen a competitive advantage. To keep its edge in catalysts for Houdry applications, to convert paraffin's into olefins, SC-UCI needed to develop and demonstrate to the market a new, more stable product. To counter the long testing period traditionally needed to prove catalyst stability developed new methodology, an accelerated ageing test. Invented, validated and adopted a novel procedure to simulate years of aging in only a matter of months. Protected the test as a trade secret rather than a patent to impede competitors from replicating the methodology. Accelerated go-to-market cycles, carving out a more than 20-year-long competitive advantage.

Devised a workaround to proposed environmental regulations. The US EPA was considering restrictions on materials containing chromium VI, posing a challenge for SCI-UCI's Houdry products. Devised and demonstrated a commercially viable methodology for converting Cr VI to innocuous Cr III to meet the proposed standards. Although the stricter standard was never implemented, provided a trade secret solution as insurance against potential reconsideration of the regulation.

Cured a potentially catastrophic plant issue for a client. During a routine monitoring of catalyst sample by SCI-UCI for a client, a Middle Eastern manufacturer of isobutylene used in MBTE production, discovered unusual contaminants suggesting an upstream equipment issue. Recommended that client shut down operations to conduct an equipment inspection, which uncovered devastating wear and looming failure of the plant's charge heaters. Enabled the client to avoid a ruinous and costly total plant failure by conducting overdue maintenance, ultimately saving up to \$10M in repair and interruption costs.

Earlier: Principal Research Chemist and Sr. Research Chemist, Air Products & Chemicals Inc. Accomplishments include:

Leveraged new technology to cut costs & provide on-demand testing. Testing purity of polymers being developed at Air Products was time consuming and costly due to bureaucratic silos. Identified a newly released low-cost IR testing instrument suitable for the R&D lab. Won management approval to procure the tool. Enabled fast, easy testing processes. Saved \$40K in annual chargebacks from the testing department, capturing full ROI on the instrument in only six months.

EDUCATION

PhD in Chemistry, Warsaw University of Technology, Warsaw, Poland.

Post-Doc in Organometallic Chemistry, Tulane University.

Research Fellow in Chemistry, Australian National University.

Research Associate in Chemistry, University of California Santa Barbara.

Master of Science in Chemical Process Technology, Warsaw University of Technology.

INTELLECTUAL PROPERTY

I am the co-holder of 33 US and/or international product and/or process patents, as well as several pending patent applications.

Among these are patents for catalyst carriers, epoxidation processes, highly-selective ethylene oxide catalysts, dehydrogenation processes and catalysts, selective hydrogenation catalysts, cuprous compositions, and controlled molecular weight poly(alkylene carbonate) production processes, among others.

A complete list follows on page 5.

PUBLICATIONS

A frequent contributor to academic and industry conferences, I have co-authored 26 academic papers and journal articles that have been published in *Applied Catalysis, Inorganic Chemistry, Inorganic Synthesis, Organometallic Chemistry, The Journal of Chemistry, Journal of the American Chemical Society* and other respected publications.

A complete bibliography follows on pages 6-7.

PROFESSIONAL AFFILIATIONS

Member of the *American Chemical Society* (ACS).

PERSONAL INFORMATION

Married with three children, I am a US Citizen. Having worked in or traveled to dozens of countries on six continents, I am comfortable in multicultural settings. I am fluent in English and Polish and conversant in Russian.

INTELLECTUAL PROPERTY

I am the co-holder of the following patents:

1. 9,321,035. Modified carrier for silver based ethylene oxide catalyst.
2. 9,096,562. Epoxidation process.
3. 9,095,843. Carrier treatment to improve catalytic performance of an ethylene oxide catalyst.
4. 8,975,424. Zinc-promoted catalysts for epoxidation of ethylene.
5. 8,916,495. Mullite-containing carrier for ethylene oxide catalysts.
6. 8,883,678. Carrier for ethylene oxide catalysts.
7. 8,883,675. Method for making a highly selective ethylene oxide catalyst.
8. 8,680,357. Dehydrogenation catalyst.
9. 8,624,045. Process for olefin oxide production.
10. 8,586,769. Carrier for ethylene oxide catalysts.
11. 8,546,297. Method for preparing an epoxidation catalyst.
12. 8,530,682. Process for epoxidation start-up.
13. 8,349,765. Mullite-containing carrier for ethylene oxide catalysts.
14. 8,063,261. Multi-layered dehydrogenation catalyst system and process of use.
15. 7,910,518. Geometrically sized solid shaped carrier for olefin epoxidation catalyst.
16. 7,803,957. Ethylene oxide production using fixed moderator concentration.
17. 7,763,096. Recovery of rhenium.
18. 7,759,284. Calcination in an inert gas in the presence of a small concentration of an oxidizing component.
19. 7,696,368. Start-up of high selectivity catalysts in olefin oxide plants.
20. 7,491,860. Dehydrogenation process.
21. 7,435,862. Radial reactor loading of a dehydrogenation catalyst.
22. 6,936,568. Selective hydrogenation catalyst.
23. 6,756,339. Dehydrogenation catalysts.
24. 6,465,704. Dehydrogenation catalysts.
25. 6,242,379. Dehydrogenation catalysts.
26. 6,191,065. Dehydrogenation catalysts.
27. 6,177,602. Process for dehydrogenation of alkylaromatic hydrocarbons using a dehydrogenation catalyst.
28. 5,258,571. Separations using highly dispersed cuprous compositions.
29. 5,175,137. Highly dispersed cuprous compositions.
30. 5,026,676. Catalyst for the copolymerization of epoxides with CO₂.
31. 4,981,948. Zinc-containing solid catalyst. Process of preparing same and process for preparing polyalkylene carbonate.
32. 4,943,677. Making poly(alkylene carbonates) of controlled molecular weight.
33. #126317. Polish patent: "Method of preparation of high molecular weight poly(3,3-bis(chloromethoxy)oxetane. Warsaw 1984.

PUBLICATIONS

1. Alternating Copolymerization of Carbon Dioxide and Propylene Oxide in the Presence of Organometallic Catalysts, W. Kuran, S. Pasynkiewicz, J. Skupinska and A. Rokicki, *Makromol. Chem.* **177**, 11-20 (1976).
2. Zmodyfikowana metoda otrzymywania związkow dwualkilocynkowych (Modified Method of Preparation of Dialkylzinc Compounds), W. Kuran and A. Rokicki, *Przemysl Chem.*, **57**, 347-349 (1978).
3. On the Products of Reactions of Zinc Dialkyls with Pyrogallol, W. Kuran, A. Rokicki and S. Pasynkiewicz, *J. Organomet. Chem.* **157**, 135-143 (1978).
4. Copolymerization of Carbon Dioxide and Propylene Sulfide, W. Kuran, A. Rokicki and W. Wielgopolan, *Makromol. Chem.* **179**, 2545-48 (1978).
5. Effect of Heteroatom X in the Catalytic System $ZnR_2/o-, m-HXC_6H_4XH$ on the Copolymerization of Carbon Dioxide with Propylene Oxide, W. Kuran, A. Rokicki and E. Wilinska, *Makromol. Chem.* **180**, 361-366 (1979).
6. Polymerization of Propylene Oxide in the Presence of Diethylzinc / Pyrogallol Catalytic System, W. Kuran, A. Rokicki and J. Pienkowski, *J. Polym. Sci., Polym. Chem. Ed.* **17**, 1235-1238 (1979).
7. Copolymerization of Carbon Dioxide and Propylene Oxide in the Presence of Catalysts Based on Metal Alkyls and Pyrogallol, A. Rokicki and W. Kuran, *Makromol. Chem.* **180**, 2153-2161 (1979).
8. A New Route for Synthesis of Oligomeric Polyurethanes. Alternating Copolymerization of Carbon Dioxide and Aziridines, W. Kuran, A. Rokicki, D. Romanowska, *J. Polym. Chem., Polym. Chem. Ed.* **17**, 2003-2009 (1979).
9. On the Physico-Mechanical Properties of CO_2 Copolymers with Heterocyclic Monomers, W. Kuran and A. Rokicki, *Angew. Macromol. Chem.* **78**, 217-220 (1979).
10. The Application of Carbon Dioxide as Direct Material for Polymer Synthesis in Polymerization and Polycondensation Reactions, A. Rokicki and W. Kuran, *J. Makromol. Sci.-Rev. Makromol. Chem.* **C21**, 135-186 (1981).
11. The Importance of Reactions of Oxygen Bases with Metal Carbonyl Derivatives in Catalysis. Homogeneous Catalysis of Water Gas Shift Reaction, D. J. Darensbourg and A. Rokicki, *ACS Symposium Series* **152**, 107-121 (1981).
12. The Facile Reduction of Carbon Dioxide by Anionic Group 6b Metal Hydrides. Chemistry Relevant to Catalysis of Water Gas Shift Reaction, D. J. Darensbourg, A. Rokicki and M. Y. Darensbourg, *J. Am. Chem. Soc.* **103**, 3223-3224 (1981).
13. Dwutlenek wegla jako monomer w procesach polimeryzacji (Carbon Dioxide as Monomer in Polymerization Processes), A. Rokicki and W. Kuran, *Wiad. Chem.* **35**, 809-831 (1982); *CA*: **97** 39419w.
14. Reduction of Carbon Dioxide and Carbonyl Sulfide by Anionic Group 6b Metal Hydrides and Alkyls. Carbon-Hydrogen and Carbon-Carbon Bond Formation Processes and Structure of $[PPM [Cr(CO)_5SC(O)1-11]$, D. J. Darensbourg and A. Rokicki, *J. Am. Chem. Soc.* **104**, 349-350 (1982).
15. Reactions of Cryptand Solubilized NaSH in Aprotic Solvents with the Group 6b Metal Hexacarbonyls. X-ray Structural Analysis and Ligand Lability Studies of the Isolated $M(CO)_5SH^-$ Anions, D. J. Darensbourg, A. Rokicki and R. Kudarowski, *Organometallics* **1**, 1161-1165 (1982).
16. Anionic Group 6b Metal Carbonyl Hydrides and Formates. Chemistry Relevant to Catalysis of the Water Gas Shift Reaction by Group 6b Metal Hexacarbonyls, D. J. Darensbourg and A. Rokicki, *Organometallics* **1**, 1685-1693 (1982).

17. A Remarkable Dependence of Carbon Monoxide Insertion into a Pt(II)-C σ -Bond on the Nature of the Coordinated Ditertiary Phosphines, M. A. Bennett and A. Rokicki, *J. Organometal. Chem.* **244**, C31-C34.
18. Synthesis and Reactions of Thermally Stable Platinum(II) Carboxylic Acids (Hydroxycarbonyls) Containing Ditertiary Phosphines, M. A. Bennett and A. Rokicki, *Organometallics* **4**, 180-187 (1985).
19. Preparation and Spectroscopic Properties of Cyclohexyne Platinum(0) Complexes Containing Ditertiary Arylphosphines and their Protonation Products, M. A. Bennett and A. Rokicki, *Aust. J. Chem.* **38**, 1307-1318 (1985).
20. Nucleophilic Activation of Carbon Monoxide. 4. Dihydrogen Reduction of the Methoxycarbonyl Adduct $\text{Ru}_3(\text{CO})_{11}(\text{CO}_2\text{CH}_3)$, D. J. Taube, A. Rokicki, M. Anstock and P. C. Ford, *Inorg. Chem.* **26**, 526-530 (1987).
21. Synthesis, X-Ray Structural Analysis, and Thermal Decomposition of the Platinum(II) Carboxylic Acid (Hydroxycarbonyl) $\text{trans-Pt}(\text{CO}_2\text{H})(\text{C}_6\text{H}_5)(\text{PEt}_3)_2$ Formation of a Diplatinum(II) Complex Containing Carbon Dioxide, M. A. Bennett, G. B. Robertson, A. Rokicki and W. A. Wickramasinghe, *J. Am. Chem. Soc.* **110**, 7098-7105 (1988).
22. Nucleophilic Activation of Carbon Monoxide: Applications to Homogeneous Catalysis by Metal Carbonyls of the Water Gas Shift and Related Reactions, P.C. Ford and A. Rokicki, *Adv. Organomet. Chem.* **28**, 139-217 (1988).
23. Alkyl or Aryl Bis(Tertiary Phosphine) Hydroxo Complexes of Platinum(II), M. A. Bennett and A. Rokicki, *Inorg. Synth.* **25**, 100-106 (1989).
24. A Novel Adsorption Distillation Hybrid Scheme for Propane / Propylene Separation, R. Kumar, T. C. Golden, T. R. White and A. Rokicki, *Sep. Sci. Technol.* **27**, 2157-2170, (1992).
25. Nucleophilic Activation of Carbon Monoxide. A Kinetics Investigation of the Reaction of Chloride with Triruthenium Dodecacarbonyl, J. Lillis, A. Rokicki, T. Chin and P. C. Ford, *Inorg. Chem.* **32**, 5040-5043, (1993).
26. Mechanistic insights into enhanced metathesis of ethylene and 2-butene on tungsten incorporated ordered mesoporous silicates Jian-Feng Wu, Anand Ramanathan, William K. Snavely, Hongda Zhu, Andrzej Rokicki, Bala Subramaniam, *Applied Catalysis A: General*, **528**, 142-149 (2016).