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## Scott W. Cowley

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### Professional Preparation

- B.S. Chemistry, Utah State University, 1967
- M.S. Organic Chemistry, Utah State University, 1971
- Ph.D. Organic Chemistry, Southern Illinois University, 1975

### Appointments

- 1975-76 Postdoctoral Fellow, University of Utah
- 1976-79 Assistant Professor of **Fuels Engineering**, University of Utah
- 1979-84 Assistant Professor of Chemistry, Colorado School of Mines
- 1984-present Associate Professor of Chemistry, Colorado School of Mines

### Selected Offices Held, Honors, Awards, Patents

- 1981 Marathon Oil Industrial Faculty Fellowship
- 1988 S.W. Cowley & M. Karpuk, "Enhanced Performance of Ethanol Fueled Engines During Cold Start Conditions", US Patent 192243, May 10.
- 1991-1995 Chairman, Rocky Mountain Fuel Society
- 1994 CSM Faculty Senate Distinguished Lecturer Award
- 1995 Program Chairman, North American Catalysis Society
- 1996-2000 President, Western States Catalysis Society
- 2000 Alumni Lecturer Award, Southern Illinois University
- 2000-2001 Outstanding Graduate Professor Award, CSM Chemistry Dept.
- 2002-2003 Outstanding Graduate Professor Award, CSM Chemistry Dept.

### Recent Publications

- M.A. Plummer and S.W. Cowley, "Solvent Effects in the Conversion of Anthraquinone to Anthrahydroquinone and Simultaneously Hydrogen Sulfide to Hydrogen and Sulfur", *Molecular Physics*, **2007**, 105 (4), 437-443.
- J.E. Leisch, J. AbuShama, S.W. Cowley, R.Noufi, and J.A. Turner, "A Novel Electrolytic Cell for Water Electrolysis in Hydrogen Generation", *Prepr.-Pap.-Am. Chem. Soc., Div. Petroleum Chem.*, **2006**, 51(1), 67.
- M.A. Plummer and S.W. Cowley, "Chemical Mechanisms in Hydrogen Sulfide Decomposition to Hydrogen and Sulfur", *Molecular Simulations*, **2006**, 32(2), 101-108.
- E. Krisanti, J.J. Robertson, M.A. Plummer, and S.W. Cowley, "The Conversion of Hydrogen Sulfide into Hydrogen and Sulfur Using a Two Stage Quinone and Catalyst Cycle," *Prepr.-Pap.-Am. Chem. Soc., Div. of Petroleum Chem.*, **2006**, 51(1), 505.
- E. Krisanti, J.J. Robertson, G.B. Lucas, M.A. Plummer, and S.W. Cowley, "Conversion of Hydrogen Sulfide into Hydrogen and Sulfur", *Prepr.-Pap.-Am. Chem. Soc., Div. Fuel Chem.*, **2005**, 50(2), 515.
- Mark A. Plummer and Scott W. Cowley, "Computational/Experimental Determination of Sulfur Polymerization Mechanisms During Decomposition of Hydrogen Sulfide into Hydrogen and Sulfur", *AIChE Conference Proceedings, San Francisco*, California, November 18, **2003**.

### **A Selection of Five Additional Publications**

- T. Kito-Borsa and Scott W. Cowley, "Kinetics, Characterization, and Mechanism for the Selective Dehydration of Ethanol to Diethyl Ether over Solid Acid Catalysts", Prepr.-Pap.-Am. Chem. Soc., Div. Fuel Chem., **2004**, 49(2), 856.
- T. Kito, J. Wittayakun, D.A. Pacus, S. Selim, and S.W. Cowley, "Properties of an Ethanol-Diethyl-Ether-Water Fuel Mixture for Cold-Start Assistance of an Ethanol-Fueled Vehicle", Industrial & Engineering Chemistry Research, **1998**, 37 (8), 3366.
- T. Kito, J. Wittayakun, D.A. Pacus, S. Selim, and S.W. Cowley, "The Catalytic Dissociation or Dehydration of Ethanol for On-Board Cold Start Assistance of an Ethanol Vehicle", Proceedings of the Eleventh International Alcohol Fuels Symposium, Vol. 1, Sun City, South Africa, **1996**, pp 166-177.
- J. Dippe, M.E. Karpuk and S.W. Cowley, "Design of a Catalytic Methanol Dehydration Reactor for Cold Starting Methanol Fueled Engines", Proceedings of the Ninth International Alcohol Fuels Symposium Vol.2, Florence, Italy, **1991**, pp 580-585.
- D.T. Wickham, B.W. Logsdon, C.D. Butler, and S.W. Cowley, "A TPD and XPS Investigation of Palladium on Modified Alumina Supports Used for The Catalytic Decomposition of Methanol", Journal of Catalysis, **1991**, 128, 198.

### **Current Courses Being Taught at CSM:**

- Supervise Undergraduate Organic Lab Courses (Three faculty and 3-4 Teaching Assistants)
- Summer Synthesis Course with Focus on Green Chemistry (Undergraduate)
- Advanced Organic Chemistry (Graduate Course, Fall Semester)
- Principles of Surface Analysis (Graduate Course, Spring Semester, in Even Years)
- Fundamentals of Heterogeneous Catalysis (Graduate Course, Spring Semester, in Odd Years)

### **Selected Final Reports:**

1. J.E. Leisch and S.W. Cowley, "CuInSe<sub>2</sub> and Related Alloy Thin Film Semiconductors for Photoelectrochemical Hydrogen Production", NREL, Contract No. KXEA-3-33607-00, **2006**.
2. L.K. Kjeldsen and S.W. Cowley, "Porphyrin Modified GaInP<sub>2</sub> Surfaces for Hydrogen Production via Photoelectrochemical Water Splitting", NREL, Contract No. X, **2003**.
3. S.Youngwilai and S.W. Cowley, "Exploratory Study of the Catalytic Hydrotreatment of Acid Hydrolyzed Lignin Products", NREL, Contract No. XCO-8-18100-01, **1999**.
4. T. Kito and S.W. Cowley, "Generation of Ethyl Ether in an Ethanol Vehicle System for Cold-Start Assistance", NREL, Contract No. XCF-5-14380-01, **1997**.
5. D.Pacas and S.W. Cowley, "Preparation and Characterization of Sorbents Consisting of Gold Metal on Silica and Alumina Supports" ADA Technologies, Contract No. 96156, **1997**.
6. C.M. Tuell and S.W. Cowley, "Chemical Etching of Semi-Crystalline Silicon by Aqueous Alkali Base" Solarex, **1996**.
7. A. Bauer and S.W. Cowley, "Herstellung und Charakterisierung eines Gold-Sorbenten mit Silica und Lanthana-modifizierten Silica Trager" ADA Technologies and the Fachhochschule Muenster, **1994**.
8. S.W. Cowley, T. Kito, and J. Wittayakun, "Support for Hydrogen from Ethanol for Future Transportation Applications", NREL, Contract No. XCC-3-13438-01, **1994**.
9. X. Zhao and S.W. Cowley, "The Preparation, Characterization, and Testing of Catalysts for Use in the Hydrotreatment of Model Lignin Feedstocks", NREL, Contract No. X-6-06111-1, **1993**.
10. M.E. Karpuk, T. McKinnon, D.T. Wickham, B.W. Logsdon, and S.W. Cowley, "Methanol as a Heat-Sink Fuel for Hypersonic Aircraft", Department of the Air Force, Wright-Patterson AFB, Contract No. WL-TR-91-2107, **1992**.
11. P. Dryer, M. Young, T. Furtak, I. Harvey, F. Schowengerdt, J. Trefny, and S.W. Cowley, "A Study of the Dark Voltage Decay Problems in Multilayered Photoconductor Films", IBM, Project No. 4-49025, **1989**.

13. J.D. Wright, L.N. Bliss, L.A. Laffoon, and S.W. Cowley, "Materials for the Selective Adsorption of Carbon Monoxide", EPA, Contract No. 68D80045, **1989**.
14. M. Karpuk, M. Mohr, K. Wilson, and S.W. Cowley, "On-board Dimethyl Ether Generation to Reduce Methanol Fueled Vehicle Emissions During Cold Operation", EPA, Contract No. 68-02-4483, **1988**.

**Experience as a Researcher and Consultant:**

I have over 31 years experience in the area of catalyst design, synthesis, characterization, and testing. Research interests focus on the generation and use of fuels used in the transportation industry. Fundamental chemical concepts have been used to solve a broad range of problems in the petroleum refining, chemical, automotive, aerospace, environmental, and imaging areas. My work has been funded by a wide variety of government and industrial organizations, including the National Science Foundation (NSF), NASA, the Department of Energy (DOE), the National Renewable Energy Lab (NREL), the Environmental Protection Agency (EPA), the Department of Defense (Air Force at Wright-Patterson), the Gas Research Institute (GRI), Marathon Oil Company, Lexmark International, and IBM. I have served as a consultant for IBM, Ricoh, Lexmark International, Coors, Bacardi, Quoin Industrial, Technology Development Associates (TDA), ADA Technologies, The Grain Processing Corporation, Marathon Oil Company, Phillips Petroleum, Great Western Inorganics, The Water Company, National Alternative Fuels Federation, Kergy (Ethanol Fuels), Advanced Forming Technologies, Fowler, Shinberg & Flanagan (lawfirm), etc.