

J. David Carter

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Professional Experience

- **1996-Present.** Materials Engineer at Argonne National Laboratory. Electrochemical Ceramics Group Leader, supporting solid oxide fuel cell development for the (Solid State Energy Conversion Alliance - SECA) and high temperature steam electrolysis (Nuclear Hydrogen Initiative).
- **1994-1996.** Postdoctorate at Argonne National Laboratory.
- **1992-1994.** Visiting Scientist at Risoe National Laboratory.
- **1987-1988.** Lab Technician at Ceramatec Inc.

Education

- Ph.D., Ceramic Engineering, University of Missouri-Rolla, 1989.
- M.S., Ceramic Engineering, University of Missouri-Rolla, 1992.
- B.S., Material Science and Engineering, University of Utah, 1988.

Awards

- Excellence in Technology Transfer Federal Laboratory Consortium for Technology Transfer (2002)
- R&D 100 Award, Autothermal catalyst development for reforming hydrocarbon fuels to hydrogen (2001)
- National Laboratory Fuel Cell R&D Award (2000)

Career Activities & Highlights

- Analyzed degradation of solid oxide electrolysis stack components using x-ray mapping, XANES, SEM analysis, Raman spectroscopy and 4-point probe.
- Technical advisor of Initiative for Proliferation Prevention projects-working with Praxair and Ceramatec as industry partners and scientists at former Russian and Ukrainian weapons laboratories.
- Co-developed first in situ study of lanthanum manganite air electrodes using X-ray reflectivity and XANES.
- Invented TuffCell, a metal supported SOFC stack repeat unit.
- Developed reforming and water gas shift catalysts to produce hydrogen from hydrocarbons.

- Co-developed anode-supported SOFC with a record performance 350 mA/cm² at 450 mV and 500°C.
- Developed Anode supported thin film SOFC
- Developed Tape casting, Screen printing, Gel casting processes for SOFC fabrication.

Publications & Presentations

J. R. Mawdsley, J. D. Carter, A. J. Kropf, B. Yildiz, V. A. Maroni, "Post-Test Evaluation of Oxygen Electrodes from Solid Oxide Electrolysis Stacks," *International Journal of Hydrogen Energy*, 34 (9), 4198-4207 (2009).

J. D. Carter, T. A. Cruse, B. J. Ingram, M. Krumpelt, "Factors Limiting the Low-Temperature Operation of SOFCs," *Handbook of Fuel Cells – Advances in Electrocatalysis, Materials, Diagnostics and Durability*, Vol. 5., Editors: Vielstich, W.; Gasteiger, H. A.; Yokokawa, H., John Wiley & Sons, Ltd.: Chichester (2009).

J. D. Carter, J. Mawdsley, "Investigation of SO₃ Electrolysis as an Alternative Step in the Sulfur-Iodine Thermochemical Process," 2007 AIChE Annual Meeting, Salt Lake City, Utah, November 2007.

J. D. Carter, D. Myers, R. Kumar, "Bipolar Plate Supported Solid Oxide Fuel Cell with a Self-Sealed Anode Compartment," 2005 Fuel Cell Seminar, Palm Springs, California, November 2005.

M. Krumpelt, T. R. Krause, J. D. Carter, J. P. Kopasz, S. Ahmed, "Fuel Processing for Fuel Cell Systems in Transportation and Portable Power Applications," *Catalysis Today*, 77 (1,2), 3-16 (2002).

R. Doshi, V. L. Richards, J. D. Carter, X. Wang, M. Krumpelt, "Development of Solid-Oxide Fuel Cells That Operate at 500C," *The Journal of The Electrochemical Society*, 146, (4), 1273-1278 (1999).

J. D. Carter, H. U. Anderson, M. G. Shumsky, "Structure and Phase Transformation of Lanthanum Chromate," *Journal of Materials Science*, 31, 551, (1996).

Patents

- J.-M Bae, J. D. Carter, M. Krumpelt, S. Ahmed, "Free Standing Monolithic Catalyst with Micro-Scale Channel Dimensions." U.S. Patent No.: 6,670,305, December 30, 2003.
- J. D. Carter, "A Low Temperature Sintering Aid for Calcium Doped Lanthanum Chromite," Danish Patent No.: 930/43 A, August 18 1993.
- J. D. Carter, J. R. Mawdsley, S. Niyogi, T. A. Cruse, X. Wang, L. Santos, "Corrosion Resistant Bipolar Plate for Polymer Electrolyte Fuel Cells," Patent Application on May 28, 2008.