

## DENNIS C. KUNERTH

### **GENERAL BACKGROUND**

D. C. Kunerth has a general background in material science and chemistry with 29 years of research experience directed towards the development of nondestructive techniques to characterize materials and monitor material processes. Research efforts include the application of acoustic, radiographic, and electromagnetic techniques to various metal, ceramic, and polymer systems.

### **CURRENT EXPERIENCE**

Idaho National Engineering Laboratory - Advisory Scientist

Since January 1984, D. C. Kunerth has been performing research at The Idaho National Engineering and Environmental Laboratory, Idaho Falls, Idaho, to develop nondestructive techniques to characterize materials and monitor material processes as well as develop advanced material processes.

Implemented ultrasonic and eddy current techniques to characterize metals, ceramics, and composites

Implemented microfocus radiography techniques to characterize monolithic and composite ceramics and small-layered spheres

Developed techniques to monitor and evaluate electromagnetic forming processes of metals

Developed pulsed eddy current techniques to evaluate corrosion of low level waste drums

Evaluated eddy current and ultrasonic techniques to characterize advanced gas reactor graphite core materials

Developed eddy current array techniques to inspect closure welds of DOE spent nuclear fuel containers and Yucca Mountain waste packages

## **PREVIOUS EXPERIENCE**

Postdoctorate, Department of Mechanical Engineering, University of Minnesota, Minneapolis, Minnesota, 1983

Research Assistant, Department of Chemical Engineering and Materials Science, University of Minnesota, Minneapolis, Minnesota 1977-1982

Research Chemist, Zimpro Inc., Rothschild, Wisconsin, 1975-1977

## **PROFESSIONAL DATA**

Ph.D., Metallurgy-Materials Science, University of Minnesota, Minneapolis, Minnesota, 1982,  
Thesis: An Eddy Current Study of Solidification With and Without Induced Fluid Flow

M.S., Metallurgy-Materials Science, University of Minnesota, Minneapolis, Minnesota, 1979,  
Thesis: Monitoring Metallic Solidification Phenomena Using Eddy Currents

B. S., Chemistry, Moorhead State University, Moorhead, Minnesota, 1975

American Society for Nondestructive Testing NDT Level III Eddy Current Testing

Member: American Society For Nondestructive Testing

## **PATENTS**

D. C. Kunerth and G. D. Lassahn, "Control and Monitoring Method and System for Electromagnetic Forming Processes" U.S. Patent 4,962,656, October 19, 1990.

D. C. Kunerth J. M. Svoboda, J. T. Johnson, L. D. Harding, and K. M Klingler “ Wireless Sensor Systems and Methods and Methods of Monitoring Structures” U.S. Patent 7,180,404, February 20, 2007.

D. C. Kunerth, J. M. Svoboda, and J. T. Johnson “Systems and Methods for Measuring a Parameter of a Landfill Including a Barrier Cap and Wireless Sensor Systems and Methods” U.S. Patent 7,187,299, March 6, 2007.

## **PUBLICATIONS**

T. R. McJunkin , J. M. Davis, D. C. Kunerth and A. D. Watkins, “Ultrasonic phased array implementation of the inside diameter creeping wave sizing methodology,” in 5th International Conference on NDE in Relation to Structural Integrity for Nuclear and Pressurized Components, pp. 690-696, San Diego, California, May 2006..

Arthur D. Watkins, Dennis C. Kunerth, and Timothy R. McJunkin, “Eddy Current Examination of Spent Nuclear Fuel Canister Closure Welds, “ Proceedings of the 11<sup>th</sup> International High-

Level Radioactive Waste Management Conference (IHLRWM), American Nuclear Society, April 30-May 4, 2006, Las Vegas , NV, pp. 571-576.

Dennis C. Kunerth, John M. Svoboda, and James T. Johnson, "INL Subsurface Wireless Sensor Platform," 21<sup>st</sup> Annual International Conference on Soils Sediments and Water, University of Massachusetts, Amherst, MA, October 17-20, 2005.

David M. Weinberg, Dennis C. Kunerth, Clark L. Scott, and James T. Johnson, "Possible Approach for Monitoring, via Acoustic Technology, Changes in Seabed Structure Due to Changes in Hydrate Phase," 2002 Offshore Technology Conference, Houston, Texas, on May 6-9, 2002.

Dennis C. Kunerth, John M. Svoboda, John M. Slater, and James E. Lee, "Monitoring Moisture Content In Surface Barriers Using A Passive Sensor Platform," INRA Subsurface Science Symposium, Idaho Falls, Idaho, Sept. 6-7, 2001.

Clark L. Scott, Jamie W. Rector, Dennis C. Kunerth, and David M. Weinberg, "Laboratory Acoustic Reflection Measurements in Porous Media With THF-Hydrate," Society of Exploration Geophysicists, San Antonio, Texas, September 10-13, 2001.

D. C. Kunerth, D. M. Weinberg, J. W. Rector III, C. L. Scott, and J. T. Johnson "Acoustic Laboratory Measurements During the Formation of a THF-Hydrate in Unconsolidated Porous Media," Journal of Seismic Exploration, Vol. 9, 2001, pp. 337-354.

P. A. Lessing, A. W. Erickson, and D. C. Kunerth "Thermal Cycling of Siliconized-SiC at High Temperatures," Journal of Material Science, Vol. 36, No.6, 2001, pp. 1389-1394.

P. A. Lessing, A. W. Erickson, and D. C. Kunerth, "Electrophoretic Deposition [EPD] Applied to Reaction Joining of Silicon Carbide and Silicon Nitride Ceramics" Journal of Material Science, Vol. 35, 2000, pp. 2913-2925.

S. R. Giese, D. C. Kunerth, E. S. Peterson, and F. F. Stewart, "Investigation Into Use of a Polyphosphazene-Based Binder, Part I," AFS Transactions, 99-102, 1999, pp. 617-620.

S. R. Giese, D. C. Kunerth, E. S. Peterson, and F. F. Stewart, "Investigation Into Use of a Polyphosphazene-Based Binder, Part II," AFS Transactions, 99-103, 1999, pp. 621-624.

A. D. Watkins and D. C. Kunerth, "Prediction of Titanium Weld Properties Using Eddy Current Nondestructive Examination," Proc. of The 5th International Conference on Trends in Welding Research, Pine Mountain, Georgia, June 1-5, 1998.

Y. Sun, W-C Loo, D. C. Kunerth, T. K. O'Brien, "Finite Element Simulation of Pulsed Remote Field Eddy Current Phenomena," Review of Progress in Quantitative Nondestructive Evaluation, San Diego, CA, July 27-Aug. 1, 1997, Vol. 17A, D. O. Thompson and D. E. Chimenti, eds., Plenum Press, 1998, pp. 259-266.

D. C. Kunerth, T. K. O'Brien, L. Philipp, R. M. Suguitan, "Pulsed Eddy Current Thickness Measurements of Thin Ferromagnetic Materials Through Corrosion," Proceedings of the First US-Japan Symposium on Advances in NDT, Kahuku (Island of Oahu), Hawaii, June 24-28, 1996, pp. 281-286.

T. K. O'Brien and D. C. Kunerth, "Pulsed Eddy Current Thickness Measurements of Transuranic Waste Containers," 4th Nondestructive Assay and Nondestructive Examination Waste Characterization Conference, Salt Lake City, Utah, October 24-26, 1995, pp. 331-340.

E. S. Peterson, K. R. Arehart, D. C. Kunerth, M. L. Stone, and R. F. Hammen, "Selective Separations of Trace Metals and Organics from Water," Separation Processes: Heavy Metals, Ions and Minerals, M. Misra, Ed. pp. 27-36, TMS, 1995.

N. M. Carlson, J. A. Johnson, L. A. Lott, and D. C. Kunerth, "Ultrasonic NDT Methods for Weld Sensing," Materials Evaluation, Vol. 50, No. 11, November 1992, pp. 1338-1343.

L. A. Lott and D. C. Kunerth, "NDE Testing and Inspection," Engineered Materials Handbook, Ceramics and Glasses, Vol. 4, ASM International, 1991, pp.617-627.

L. A. Lott, D. C. Kunerth, and G. W. Characklis, "Acousto-Ultrasonic NDE of Ceramic Matrix Composites," ASME International Gas Turbine and Aeroengine Congress and Exposition, Orlando, Florida, June 3-6, 1991, 91-GT-286.

L. A. Lott and D. C. Kunerth, "NDE of Fiber-Matrix Interface Bonds and Material Damage In Ceramic Composites," Conference On Nondestructive Evaluation of Modern Ceramics, Columbus, Ohio, July 9-12, 1990, pp. 135-139.

L. A. Lott, D. C. Kunerth, and G. W. Characklis, "Nondestructive Evaluation of Advanced Ceramic Composite Materials," Proceedings of the Fifth Annual Conference on Fossil Energy Materials, Oak Ridge, Tennessee, May 14-16, 1991, pp.155-161.

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K. L. Telschow, J. B. Walter, G. V. Garcia, and D. C. Kunerth, "Process Monitoring Using Optical Ultrasonic Wave Detection," Review of Progress in Quantitative Nondestructive, Brunswick, Maine, July 23-28, 1989, Vol. 9B, D. O. Thompson and D. E. Chimenti, eds., Plenum Press, 1990, pp. 2063-2068.

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J. A. Johnson, N. M. Carlson, J. O. Bolstad, L. A. Lott, D. C. Kunerth, H. B. Smartt, R. T. Allemeier, and M. B. Ward, "Automated Welding Process Sensing and Control," 2nd International Symposium on the Nondestructive Characterization of Materials, Research Council of Canada, Montreal, Canada, July 21-23, 1986, Plenum Press, pp. 409-417.

E. A. Fletcher, F. J. Macdonald, and D. C. Kunerth, "High Temperature Solar Electrothermal Processing - II. Zinc From Zinc Oxide," Energy, Vol. 10, No. 12, pp. 1255-1272, 1985.

D. C. Kunerth, Pulse-Echo Acoustic Microscopy of Silicon Carbide Heat Exchanger Tubes, SE-M-85-001, January 1985.

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L. A. Lott, D. C. Kunerth, "Instrumentation for Real-Time Ultrasonic Sensing of Arc Welding Characteristics," Proceedings of the Second Symposium on Energy Engineering Sciences, CONF-8404123, Argonne National Laboratory, Argonne, Illinois, April 10-11, 1984, pp. 126-132.

J. P. Wallace, D. C. Kunerth, and R. M. Siegfried, "Eddy Current Measurements in Steel Processing," Conference Proceedings-Physics in Steelmaking, Bethlehem, Pennsylvania, October 1981, AIP-AIME.

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J. E. Shaw, D. C. Kunerth, and S. B. Swanson, "Nucleophilic Aromatic Substitution Reactions of Unactivated Aryl Chlorides with Methoxide Ion in Hexamethylphosphoramide," Journal of Organic Chemistry, 41, pp. 732-733, 1976.

J. E. Shaw, D. C. Kunerth, and J. J. Sherry, "A Simple Quantitative Method for the Esterification of Carboxylic Acids," Tetrahedron Letters, pp. 689-692, 1973.

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