

Advanced Materials Associates

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Jacob J. Stiglich, Ph.D., President

Biographical Overview

Dr. Stiglich has more than thirty-five years experience in metallurgical technology and advanced materials and is a recognized expert on ceramic composite fabrication, CVD fluidized-bed powder coating and materials for ordnance applications. A native of Milwaukee, Wisconsin, Dr. Stiglich received his Bachelor of Science degree in Mechanical Engineering from Marquette University, and his doctorate in Materials Science from Northwestern University.

Military Highlights. Holding the rank of Colonel, USAR (Ret), Dr. Stiglich spent three years on active duty at the Army Materials Technology Laboratory. Having top-secret clearance status, he worked on projects to develop materials and processes for lightweight (ceramic) personnel and vehicular armor. He also served as Project Engineer for outside Research and Development projects, including lightweight armor materials, anti-armor materials-W, W alloys, ultra fine grain W and composites, and kinetic energy penetrators using W composites modeling and high-strain rate mechanical properties.

After completing his military service, which included four USAR tours of duty at the Pentagon ODDRE, where he was responsible for identifying new materials and processes for armored vehicles and hypersonic vehicle applications, Dr. Stiglich retired in 1992.

Professional Highlights. Both prior to and following his military service, Dr. Stiglich has maintained his strong interest in cemented carbides, ceramics, coatings and characterization, while branching out into other areas of scientific and metallurgical technology. Following is a brief summary of some of his professional career accomplishments.

Director, MME Professional Services/Research Associate, Colorado School of Mines. In addition to his responsibilities as CEO of Advanced Materials Associates, Dr. Stiglich serves as the official Point of Contact for the Department of Metallurgical and Materials Engineering outside consulting and service requests in support of projects funded by commercial firms. The projects relate to new materials development as well as current activities/problem solving, including CSM testing and characterization of materials.

Contract Senior Scientist. Materials Modification, Inc. Dr. Stiglich worked with colleagues to obtain approximately \$4 million out-of-house funded research and development work in the areas of wear and corrosion resistant coatings, and oxidation protective coatings for carbon/carbon composites for internal combustion engines, refractory metals and materials. Other research and development activities include ultra-fine grains (0.1 to 1 micron), nanoparticles (0.01 to 0.1 micron) and larger grained solids. Specific materials included ultra-fine grained aluminides W, Ta, Re, TiB₂, AlN, B₄C -- their processing, micro-structure and consolidation into useful bodies, and nano materials.

Principal Designer and Organizer, Aerojet Ordnance Chemical Vapor Deposition Laboratory and Three Other Aerojet Laboratories. Dr. Stiglich managed approximately \$1 million in advanced materials projects, and directed the sourcing acquisition of all laboratory equipment.

Assistant Director, San Fernando Laboratories. Responsible for process development projects, utilizing chemical vapor deposition technology, Dr. Stiglich spearheaded the metallurgical characterization facility expansion program, including acquisition of approximately 3/4 million dollars in equipment. In addition to program management responsibility, he served as principal technological contact for all out-of-house funded development dialogue, interaction, and contract negotiations.

Manager, Eagle Picher Industries Boron Carbide Hot Pressing Pilot Production Plant and Assistant Technical Director of the R & D Laboratory. Responsible for the company's facility expansion program, Dr. Stiglich developed an MHD electrode prototype and installed a high production hydraulic cold press to make boron nitride pre-forms for breeder reactor experimentation. Additional responsibilities included a major equipment acquisition program, and upgraded ceramic fabrication, including redesign and upgrading of the company's hot press systems.

Head of Ceramic Materials Manufacturing, Valenite Division, Valeron Corporation. Dr. Stiglich organized and installed the hot pressed ceramic cutting insert production prototype for ceramic cutting inserts, oversaw the development of ceramic material compositions and prototype tooling designs using an experimental hot press, and the design, construction and testing of semi-continuous hot press production ceramic inserts.

Chief Engineer, Boride Products, Inc. Among his responsibilities were development of Boride's hot pressing techniques and production of dense B₄C control rod materials and Al₂O₃/B₄C burnable poison materials; installation and management of the B₄C powder processing plant; and installation and supervision of the chemistry laboratory, including atomic absorption spectrophotometer and general wet chemistry techniques for boron determinations.

Other Professional Activities. Dr. Stiglich is an active participant within the engineering and materials science disciplines as well as within the community of Breckenridge, especially in the areas of emerging products and technology. Some of the work in which he is currently active are as follows.

National Science Foundation Review Panels. Dr. Stiglich is frequently invited by the NSF to serve as a Proposal Review Panel member to evaluate and select proposals from commercial and academic institutions for funding. The grants range from \$100,000 to \$750,000 and include materials development in microelectronics, nano materials and coatings/surface modification technologies.

Research, Technical Editing & Writing. Co-editor of three books on surface engineering, Dr. Stiglich serves as a peer review editor for "*Materials & Manufacturing Processes*." He has taught courses throughout the United States in surface engineering and failure analysis.

Conferences and Memberships. An active member of ASM, TMS, the American Ceramic Society, American Powder Metallurgy Society, and MENSA International, Dr. Stiglich has served as co-chairman of a number of international conferences on surface modification, which have been held in numerous countries on three continents.

Patents, Publications and Presentations. Dr. Stiglich holds two patents on lightweight armor configurations, and has authored more than one hundred scientific papers and reports on metallurgy and ceramic materials. Selected publications, lectures and presentations follow.

Selected Publications.

- Zhengui Yao, J. J. Stiglich and T. S. Sudarshan. "*Nano sized WC-Co Holds Promise for the Future.*" PM Special Feature, Metal Powder Report.
- Zhengui Yao, J. J. Stiglich and T. S. Sudarshan. "*WC-Co Enjoys Proud History and Bright Future.*" PM Special Feature, Metal Powder Report.
- R. Kumar, J. J. Stiglich, T. S. Sudarshan and C. C. Yu. "*Consolidation of Nano-Composites for Thermal Management.*" Materials and Manufacturing Processes.
- N. Dahotre, J. J. Stiglich and J. Hampikian. "*High Temperature Coatings.*" Proceedings Volume published by TMS.
- J. J. Stiglich, B. E. Williams and R. B. Kaplan. "*CVD Coated Tungsten Powder Composites I: Processing and Characterization.*" Presented at the TMS Annual Meeting, New Orleans, LA; Published in Tungsten and Tungsten Alloys: Recent Advances, A. Crowson eds. (The Metallurgical Society, Warrendale, PA).
- J. J. Stiglich, B. E. Williams and R. B. Kaplan, "CVD Coated Tungsten Powder Composites II: Fabrication and Properties." Presented at TMS Annual Meeting, New Orleans, LA; Published in Tungsten and Tungsten Alloys - Recent Advances, A. Crowson and E. S. Chen, eds, (The Metallurgical Society, Warrendale, PA).
- B. E. Williams, J. J. Stiglich, et al. "A Major Advance in Powder Metallurgy." Presented at Second National Technology Transfer Conference (Technology 2001), San Jose, CA; Published in "Conf. Prod" NASA CP-3136, Vol. 1.
- J. J. Stiglich, Tracy, M.J., et al. "*Consolidation Methods for Nano crystalline Tungsten and Tungsten Coated Powders.*" Sintering Seminar. Pennsylvania State University.
- Jacob J. Stiglich, Raghunathan and T.S. Sudarshan. "*Ir-Re Duplex Coatings on Ta / 10W by Pulsed Electrode Surfacing.*" Symposium on High-Temperature Coatings, Rosemont, Illinois.
- Jacob J. Stiglich, B. E. Williams, et al. "*A Major Advance in Powder Metallurgy.*" Presented at the 2nd National Technology Transfer Conference: Technology 2001, San Jose, California.
- Jacob J. Stiglich, et al. "*CVD Coated Tungsten Powder Composites, Part II: Powder Fabrication & Properties.*" Proceedings of TMS Refractory Metals Symposium on Tungsten and Tungsten Alloys - Recent Advances, TMS Meeting, New Orleans, Louisiana.
- Jacob J. Stiglich and R. Tuffias. "*High Temperature Aerospace Coatings.*" Proceedings of the 4th International Conference on Surface Modification Technologies, Paris, France.
- Jacob J. Stiglich, et al. Part I of two part review of cemented tungsten carbides. "*WC-Co Enjoys Proud History and Bright Future.*" Journal for the Powder Metallurgy Industry, "Metal Powder Report."
- Jacob J. Stiglich, et al. Part II of two part review of cemented tungsten carbides. "*Nano sized WC-Co Holds Promise for the Future.*" Journal for the Powder Metallurgy Industry, "Metal Powder Report."

Selected Presentations

- MRS Fall Meeting, Boston, MA. "*The Coating of Powders by Chemical Vapor Deposition.*"
- 15th Annual Conference on Composites and Advanced Ceramics, Cocoa Beach, FL. "*Improved Composite Powder Fabrication.*"
- ASM Meeting, Muncie, Indiana. "*Vacuum Hot Pressing of Metals, Ceramics & Composite Materials.*"
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- University of Michigan Management Briefing Seminar. "*Vacuum Hot Pressing of Rotary Engine Seal Materials.*"
- Engineering Society of Detroit- Innovations: Manufacturing the Wankel. "*Vacuum Hot Pressed Composite Materials for the Rotary Engine.*"
- American Ceramic Society Fall Meeting, Portland, Oregon. "*Solid State Reacted B4C.*"

- National Meeting of the American Ceramic Society. *"Ti - B4C Gradient Armor."*
- Ceramic Society West Coast Meeting, Los Angeles, California. *"Inter-diffusion and Defect Structures in NiO and CoO Solid Solutions"* and *"Hot Pressing of B4C Materials for Nuclear Applications."*
- ASM/AIME Fall Meeting, Detroit, Michigan. *"Inter-diffusion in NiO / CoO Solid Solutions."*
- American Ceramic Society National Meeting. *"Further Developments in Gradient Armor."*
- American Ceramic Society National Meeting. *"Ceramic Materials & Processing for Armor" and "Gradient Armor Systems."*

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