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PROFESSIONAL PREPARATION

The Ohio State University, Columbus, OH

- Ph.D. Materials Science and Engineering 12/2004
- M.S. Materials Science and Engineering 03/2003

Northeastern University, Shenyang, China

- M.Eng. (with Honors) Metallurgical Engineering 08/2000
- B.Eng. (with Honors) Metallurgical Engineering 07/1998
- B.Eng. (minor) Management Engineering 07/1998

APPOINTMENTS

- 10/2004 – Present Post-doctoral Research Fellow, The University of Arkansas, Fayetteville, Arkansas 72701, USA.
Synthesis of nanoparticle-based solid lubricants using ball milling, Electrostatic Spray Coating (ESC) and Chemical Vapor Infiltration (CVI) as well as other binding techniques; Tribological evaluation of the coatings; Characterization of the as-prepared nanostructured coatings with Scanning Electron Microscopy (SEM), Energy Dispersive Spectroscopy (EDS), x-ray Diffraction (XRD), atomic force microscopy (AFM) and nano-indentation equipments; Mentoring undergraduate and graduate students in the research group; and Development of research proposals.
- 11/2004 – 02/2005 Sr. Research and Development Engineer, NanoMech LLC., Fayetteville, Arkansas 72701, USA.
Design and development of nanocoatings and processes for the realization of nano-engineered surfaces for advanced manufacturing and severe tribological applications; Work with electrostatic spray coating (ESC) equipment, various types of bonding techniques including chemical vapor infiltration (CVI), laser, and microwave sintering, characterization techniques such as scanning electron microscope (SEM), Raman spectroscopy, X-ray diffraction (XRD), and manufacturing environment for the evaluation of the coatings.
- 09/2000 - 08/2004 Graduate Research Associate, The Ohio State University, Columbus, Ohio 43210, USA

Identification of the lubrication mechanisms involved in the sliding of nanocomposite WC/Diamond-like Carbon/WS₂ (“WCS”) wear-resistant novel coatings in different operating environments (like ambient air, vacuum or nitrogen), with the collaboration of researchers at Air Force Research Laboratory at Wright-Patterson Air Force Base, USA. The sliding tests were done on a tribometer, while all kinds of surface and bulk characterizations involved the use of SEM, EDS, Focus Ion Beam (FIB), Transmission Electron Microscopy (TEM), X-ray Photoelectron Spectroscopy (XPS), Raman Spectroscopy and Secondary Ion Mass Spectroscopy (SIMS).

- 01/2002 – 06/2002 Graduate Teaching Associate, Department of Materials Science and Engineering, The Ohio State University, Columbus, Ohio 43210, USA.
1) Tutored junior students for microstructures/properties analysis in the MSE542.02 Structure Laboratory course.
2) Helped train junior students for materials characterization techniques: XRD and SEM in MSE341 class.
3) Evaluated students’ class performance and graded their homework and exams for MSE205: *Introduction to Materials Science and Engineering*.
- 08/1998 - 08/2000 Graduate Research Assistant, Northeastern University, Shenyang 110004 CHINA.
1) Experimentally clarified the catalytic mechanism of alkali additives on the carbothermic reduction of pre-oxidized ilmenite with analytic techniques such as SEM, EPMA, and XPS.
2) Designed a high-performance data acquisition system, operating from high (~1500 °C) to low (room) temperature. The system could sense mass change down to 10⁻³ mg.
3) Determined the relationship between the amount of alkali additives and reduction rate of pre-oxidized ilmenite, and the effectiveness of different alkali additives.

QUALIFICATIONS

- Design and synthesis of nanostructured coatings for different tribological and mechanical applications.
- Material microstructure / composition characterization -- knowledge and experience with SEM, EDS, ESEM, FIB, AFM, TEM, XPS, XRD, DSC, SIMS, Raman Spectroscopy, Optical Microscopy, and Microhardness Measurement.
- Implementation of large-scale Molecular Dynamics (MD) simulation analysis using both commercial packages and self-developed codes.
- Friction and wear testing with *in situ* non-contact monitoring devices (Kelvin probe, CCD etc.); evaluation of material performance under different conditions.
- Leading in-house research and development effort for NanoMech’s nanostructured coating technology.

- Strong teamwork ability: excellent collaboration with researchers at Ohio State University, Air Force Research Laboratory (AFRL), Oak Ridge National Laboratory (ORNL), and University of Michigan.

RESEARCH AND DEVELOPMENT INTEREST

- Nano- and micro- materials systems and their structure-property relationship.
- Nanostructured hard and solid lubricating thin films and coatings for tribological applications.
- Materials processing and materials characterization with optical, x-ray and electron techniques.

HONORS AND MEMBERSHIP

- Alumni Grants for Graduate Research and Scholarship, *awarded to individuals with demonstrated strong research ability*, Ohio State University (2003).
- Best Poster Award, Gordon Research Conference in Rhode Island (2002).
- Inducted to **Alpha Sigma Mu**, a professional honor society for Materials Science and Engineering (2002-present).
- Student and individual membership of **ASM international** (2001-present).
- Student and individual membership of **TMS** (2004) and **Materials Research Society (MRS)** (2003-present).
- Excellent Graduate Scholarship, Northeastern University (1998-1999).
- “Zhongxi” Scholarship, *awarded to only the top 1% of students*, Northeastern University (1994-1996).
- University Fellowship for excellent students, Northeastern University (1994-1997).

MAJOR ACHIEVEMENTS

- Successfully identified the lubrication mechanisms involved in the sliding of WCS wear-resistant novel coatings in different operating environments, with the collaboration of researchers at Air Force Research Laboratory at Wright-Patterson Air Force Base, USA.
- Simulated the effect of soft/hard nanoparticles in a model amorphous system under compression and shear conditions with 2D large-scale non-equilibrium molecular dynamics (NEMD) simulations.
- Won AGGRS scholarship in The Ohio State University due to outstanding research performance.
- Completed Master of Engineering study in Northeastern University well ahead of regular time frame due to excellent research performance and strong publications.

MAIN PUBLICATIONS (Research in progress not included)

1. **J. -H. Wu**, Wenping Jiang, B.S. Philips, J.H. Sanders, J.S. Zabinski and A.P. Malshe, *Tribological Performance of Burnished MoS₂ on cBN-TiN Coatings*, Submitted to 2005 ASME International Mechanical Engineering Congress and Exposition, Orland, Nov. 5-11, 2005. (Accepted)
2. **J. -H. Wu**, S. Karthikeyan, M.L. Falk and D. A. Rigney, *Tribological Characteristics of Diamond-like Carbon (DLC) Based Nanocomposite Coatings*, *Wear*, 259 (2005) 744-751.

3. **J. -H. Wu**, D. A. Rigney, *et al.*, *Tribological Behavior of WC/DLC/WCS Nanocomposite Coatings*, Surf. Coat. Technol., 188-189C (2004) 605-611.
4. **J. -H. Wu**, M. Sanghavi, J.H. Sanders, A.A. Voevodin, J.S. Zabinski and D.A. Rigney, *Sliding Behavior of Multifunctional Composite Coatings Based on Diamond-like Carbon*, Wear, 255 (2003) 859-868.
5. S. Karthikeyan, **J.-H. Wu** and D.A. Rigney, *The role of vorticity in the formation of tribomaterial during sliding*, Procs. Symposium on Nanoscale Materials and Modeling - Relations Among Processing, Microstructure, and Mechanical Properties, MRS, San Francisco, April, 2004, MRS Vol. 821, Eds. P.M. Anderson, T. Foecke, A. Misra, R.E. Rudd, pp. 9.6.1-9.6.6.
6. K. Sun and **J. -H. Wu**, *Catalytic Mechanism of KCl during Carbothermic Reduction of Pre-oxidized Ilmenite*, J. Iron & Steel Res., Int'l, 8 (2001) 7-11.
7. **J. -H. Wu**, K. Sun, Y. -Y. Ma, *et al.*, *Catalytic Effect of Alkali Chlorides on Carbothermic Reduction of Pre-oxidized Ilmenite*, Trans. Nonferrous Met. Soc. China, 10 (2000) 813-816.
8. K. Sun, **J. -H. Wu**, Y. -Y. Ma, and L. -F. Liang, *Study on Synthesis of BaTiO₃ in Molten Medium*, Mater. Rev. (China), 14 (2000) 60-62.
9. **J. -H. Wu**, K. Sun, W. Li and Y. -Y. Ma, *The Co-operative Catalytic Effect of Alkali Chlorides on the Carbothermic Reduction of Pre-oxidized Ilmenite*, J. Guangdong Nonferrous Met., 10 (2000) 25-29.
10. K. Sun, **J. -H. Wu**, Y. -Y. Ma, *The State-of-the-art of Nonferrous Extractive Metallurgy and Its Development Trend*, Nonferrous Metals, 51 (1999) 76-79.
11. K. Sun, Y. -Y. Ma, **J. -H. Wu**, *et al.*, *Fundamental Study on the Preparation of High Grade Titanium Dioxide by Means of Sol-Gel Method*, Acta Metallurgica Sinica, 35 (1999) S719-721.

PRESENTATIONS AT INTERNATIONAL CONFERENCES

1. **J. -H. Wu**, K. Subramanian, M.L. Falk and D. A. Rigney, *Tribological Characteristics of Diamond-like Carbon (DLC) Based Nanocomposite Coatings*, Int'l Conf. Wear of Materials, San Diego, CA, April 24th-28th, 2005.
2. **J. -H. Wu**, K. Subramanian and D.A. Rigney, *Molecular Dynamics Study on the Sliding Behavior of Composite Materials*, Gordon Research Conf., Roger Williams University, RI, June 27 - July 2, 2004.
3. **J. -H. Wu**, D. A. Rigney, J.H. Sanders, A.A. Voevodin and J.S. Zabinski, *Multifunctional DLC-based Coatings for Tribological Applications*, Int'l Conf. Wear of Materials, Washington D.C., April 2nd, 2003.
4. D. A. Rigney, **J. -H. Wu**, M. Sanghavi, J.H. Sanders, A.A. Voevodin and J.S. Zabinski, *Multi-functional Composite Coatings for Tribological Applications*, ASM, Columbus, Oct. 9, 2002.
5. **J. -H. Wu**, M. Sanghavi, J.H. Sanders, A.A. Voevodin, J.S. Zabinski and D.A. Rigney, *Tribological Behavior of Multifunctional DLC-based Nanocomposite Coatings*, Gordon Research Conf., Roger Williams University, RI, Aug. 4-9, 2002.

PROPOSALS AWARDED & PENDING

- Durable Ultrahydrophobic Nanostructured Coating, in “bird-bath”, on-site and on-demand modes, submitted to DoD on 04/15/05, Principal Investigator (PI), \$100,000. (Pending)

- Nanoengineered Solid Lubricant Coatings for Cryogenic Environments, submitted to AFOSR on 12/15/04, PI, \$100,000. (Pending)
- Collaborative Research: the Study of Novel Nano/Micro-Structured cBN-TiN Coating for Advanced Cutting Tools, submitted to NSF on 03/01/05, Co-PI, \$148,889. (Pending)
- Bio-inspired Designing of Superhydrophobic Nanostructured Coating for Anticorrosion Application for Aging Aircrafts, submitted to DoD EPSCOR on 12/01/04, Co-PI, \$593,103. (Pending)

COMPUTER SKILLS

- Windows, Mac OS, UNIX/LINUX, C, C++, FORTRAN, Mathcad, Origin, MS office package.