WINNIE TAN

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EDUCATION

Ph.D., Materials Science Engineering (GPA 3.69) Purdue University, W. Lafayette, IN Dec. 2013

B. S. Materials Science Engineering (GPA 3.40) Purdue University,

W. Lafayette, IN May 2009

SKILLS

- Optical microscopy
- Scanning Electron Microscopy
- Atomic Force Microscopy
- X-Ray Diffraction
- FTIR techniques
- Thermogravimetry Analysis
- Mechanical testing

KEY COURSES

- Physical Ceramics
- Deposition Processing of Thin Films and Coatings
- Defects in Solids
- Powder Processing
- Particle, Powder and Compact Characterization
- Quantitative Analysis of Microstructures
- Transport Phenomena
- Structure-Property Relationships of Engineering Polymers

PERSONAL STATEMENT

Self-motivated, goal-driven research scientist with both academic research and corporate work experience seeking full-time position in ceramics or plasma spray field. Highly professional, with the ability to conduct research independently or in a team. Has excellent interpersonal and communication skills, a positive attitude, and is always keen to learn.

PROFESSIONAL EXPERIENCE

Graduate Research Assistant

Aug. 2009 – present

Purdue University, School of Materials Engineering, W. Lafayette, IN

- Designed a series of experiments to create high emissivity coatings for hypersonic vehicles using plasma spray technologies
- Successfully dealt with oxidation of as-sprayed coatings, hydroxide formation of rare-earth oxides, and testing requirements.
- Utilized characterization techniques to determine the optical and thermal properties of rare-earth-modified coatings
- Developed an in-lab oxyacetylene torch testing facility to simulate hypersonic re-entry conditions, which has flow rate controls and capability to reach peak temperature of 2500°C

Key Accomplishments

- Discovered samarium and thulium have the ability to modify optical properties of ZrB₂/SiC baseline materials
- Rare-earth-modified coatings demonstrate 10% increase in total hemispherical emissivity, which allow the surface temperature to be 200°C cooler than typical ZrB₂/SiC coatings
- Co-authored a U.S. Patent based on the above material system
- Explained the effects of rare-earth oxides on oxidation mechanism of ZrB₂/SiC up to 1500°C
- Performed ablation tests under multiple conditions to rare-earth modified coatings to evaluate their durability under high temperature oxidizing atmosphere

Event Coordinator

June 2012 – May 2013

TEDxPurdueU, W. Lafayette, IN

- Organized entire Purdue TEDx event, including two multi-speaker talk sessions, a networking break, post-show receptions, and speakers' dinner
- Worked with an executive team of ten and managed team of five on fund raising, marketing, stage design, registration, and event logistics
- Raised \$10,000 by selling out all 900 tickets

Joint Research Internship

July 2010 – May 2011

Rolls- Royce Corporation, Indianapolis, IN

- Evaluated corrosion resistance on newly developed coatings for gas turbine engines by conducting corrosion testing
- Performed salt (Na₂SO₄) spraying process and testing at 700°C or 900°C at SO₃ atmosphere for as long as 500 hours

AFFILIATIONS

- American Ceramics Society (ACerS): Delegate, member
- Materials
 Advantage:
 Member
- **ASM International**: *Member*
- International Students and Scholars: Volunteer, student ambassador
- Graduate Student Association: Secretary, committee leader, mentor, member
- TEDxPurdueU: Event Coordinator (2013)
- Engineering Projects in Community Service: Project leader (2007-08)

LANGUAGES

- Chinese
- Malav
- French

INTERESTS

- Volunteering
- Hiking
- · Casual reading
- · Practicing yoga
- Cross-stitching

Scanning Electron Microscope Technician

Oct. 2009 – Aug. 2010

Purdue Electronic Microscopy Consortium, W. Lafayette, IN

- Trained graduate students on the JSM T-300 (Thermionic), JSM 6400 (Thermionic), and Phillips XL-40 (Field Emission) electron microscope
- Performed maintenance, filament changes and troubleshooting on the JSM 6400 and XL-40

Teaching Assistant

Aug. 2009 – July 2010

Purdue University, School of Materials Engineering, W. Lafayette, IN

- Gave 50 pre-lab lectures and ran lab sessions for a class of approximately 30 students for the Materials Structure and Properties Laboratory course
- Instructed a class of 15 students on the operation of a Scanning Electron Microscope

Manufacturing Engineer Internship

May 2009 – Aug. 2009

Freescale Semiconductor Inc., Malaysia

 Assisted in the Packaging Technology Research Center on front-end processes such as dicing wafers and wire bonding; and back-end process such as solder ball attachment of Ball Grid Arrays (BGA)

Undergraduate Research

Jan. 2008 – May 2009

Purdue University, School of Materials Engineering, W. Lafayette, IN

- Utilized molecular dynamic simulations to analyze solid phase epitaxial growth of Si and Si/Ge nanostructures
- Developed a new method to embrittle the CoCrMo porous coating from a metal substrate without affecting bond size

PUBLICATIONS

- W. Tan, C. Petorak, and R. Trice, "Rare-earth Modified ZrB2 High Emissivity Coatings for Hypersonic Applications," *Journal of European Ceramics Society*, accepted.
- Y. Park, **W. Tan**, and A. Strachan, "Strain Engineering via Amorphization and Recrystallization in Si/Ge Heterostructures," *Physical Review B*, **84** 125412. 2011.

PATENT

• R. Trice and **W. Tan**, "High Emissivity Coatings for Hypersonic Vehicles," Patent in review.

ORAL PRESENTATIONS

- W. Tan, A. Strachan, and R. Trice, "Rare-earth Doped High Emissivity Coatings for Hypersonic Applications," presented at International Conference on Advance Ceramics and Composites, Daytona Beach, FL, Jan. 2013.
- W. Tan, A. Strachan, and R. Trice, "Design of High Emissivity Coatings for Hypersonic Applications using Plasma Spray," presented at Materials Science and Technology, Pittsburg, PA, Oct. 2012.
- W. Tan, A. Strachan, and R. Trice, "Design of High Emissivity Coatings for Hypersonic Applications using Plasma Spray," presented at International Thermal Spray Conference, Houston, TX, May 2012.