

# Ece Alat

Address: 210 E. Hamilton Ave. Apt#36, State College, PA 16801, USA  
Phone: (814) 769-0171 | E-mail: alatece@yahoo.com, exal79@psu.edu

## OBJECTIVE

I am an expert in advanced coatings developed to enhance corrosion resistance of nuclear fuel claddings. I am a creative researcher with excellent communication, flexibility, critical-thinking, and problem-solving skills. I am seeking a position in which I can utilize my talents, improve my technical background and learn new topics.

## EDUCATION

- The Pennsylvania State University, University Park, PA** August 2013 – December 2017\*  
**Ph.D.**, GPA: 3.77 / 4.0  
Department of Materials Science and Engineering (MatSE)  
*Thesis: Ceramic Coating for Cladding (The C<sup>3</sup> Project): Advanced Accident-Tolerant Ceramic Coatings for Zr-Alloy Cladding.*
- The Middle East Technical University, Ankara, Turkey** September 2009 - September 2012  
**M.Sc.**, GPA: 3.71 / 4.0  
Department of Metallurgical and Materials Engineering  
*Thesis: Analysis of Magnesium Addition, Hydrogen Porosity and T6 Heat Treatment Effects on Mechanical and Microstructural Properties of Pressure Die Cast 7075 Aluminum Alloy.*
- B.Sc.**, GPA: 3.04 / 4.00 – Honors Student September 2003 - June 2007  
Department of Metallurgical and Materials Engineering

## WORK EXPERIENCE

- Graduate Assistant** August 2013 – present  
The Pennsylvania State University  
Department of Materials Science and Engineering, Materials for Nuclear Power Group
- developed ceramic coatings to increase corrosion performance of nuclear fuel claddings at normal operation and extreme environment conditions in a light water reactor by using characterization methods.
    - demonstrated the applicability of monolithic TiN, monolithic TiAlN, and multilayer TiN/TiAlN coatings on ZIRLO® substrates by using the cathodic arc physical vapor deposition method.
    - determined deposition parameter effects on coating morphology, composition and adhesion property.
    - identified optimized cathodic arc physical vapor deposition parameters to enhance adhesion of the coatings on flat and tubular ZIRLO®.
    - determined corrosion behavior of TiN and TiAlN in nuclear reactor environment.
    - investigated substrate preparation method effect on the coating adhesion and corrosion performance.
    - designed multilayer TiN/TiAlN coating architecture to enhance corrosion performance.
    - achieved enhanced corrosion resistance in normal operation and extreme environment conditions through the application of optimized multilayer TiN/TiAlN coatings on ZIRLO®.
  - initiated and established collaboration with other research groups.
    - characterized and analyzed pool-boiling heat transfer effect on steel, zirconium, and inconel alloys.
- R&D Engineer** April 2009 – August 2013  
The Mechanical and Chemical Industry (MKE) Corporation  
General Management, Ankara, Turkey  
Department of R&D and Technology
- monitored and reviewed the progress of the MKE supported projects conducted in collaboration with universities.
  - organized collaboration activities between universities and MKE.
  - coordinated collaboration activities between defense companies within the scope of the NATO Industrial Advisory Group (NIAG).
  - represented MKE at the following events as The Mechanical and Chemical Industry Corporation Delegate:
    - The NATO NIAG, 1<sup>st</sup> Plenary Meeting, NATO Headquarters Office, Brussels, Belgium, 2011.
    - The 17<sup>th</sup> International Symposium on Boron, Borides and Related Materials, Istanbul, Turkey, 2011.
    - The 5<sup>th</sup> Ankiros International Casting Congress, TUYAP, Istanbul, Turkey, 2010.
    - The 15<sup>th</sup> International Metallurgy and Materials Congress, TUYAP, Istanbul, Turkey, 2010.
    - The 4<sup>th</sup> Aluminium Symposium, Istanbul, Turkey, 2009.
    - The 9<sup>th</sup> International Defense Industry Fair, Istanbul, Turkey, 2009.
  - presented MKE activities at the Defense Industry Seminars, The Yildiz Technical University, Istanbul, Turkey, 2010 and 2011.
  - organized the Explosive Materials and Components Seminar in MKE, Ankara, 2009.
- Quality Engineer** March 2009 – April 2009  
The Mechanical and Chemical Industry (MKE) Corporation  
MKE Pyrotechnic Factory, Ankara, Turkey
- performed the quality control inspection of outsourced items to decide on admission to the facility.
- Scientific Programs Assistant Expert** September 2007 – February 2009  
The Scientific and Technological Research Council of Turkey (TUBITAK), Ankara, Turkey  
Department of Science and Society
- monitored and reviewed the progress and the fund usage in select TUBITAK supported projects conducted by universities.

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- accomplished literature review, concept development, and bidding process of the science center establishment project.
- represented TUBITAK at the 5<sup>th</sup> Science Centre World Congress, Toronto, Canada.
- analyzed science communication approaches in the world.

## Intern

The Turkish Atomic Energy Authority (TAEK), Ankara, Turkey  
Department of Technology

July – August 2006

- characterized samples by using X-ray diffraction and thermogravimetric analysis methods.

The Turk Tractor and Agricultural Machinery Corporation, Ankara, Turkey  
Department of Gear and Heat Treatment

August – September 2005

- observed gear production, and heat treatment application effect on mechanical properties.

## PUBLICATIONS

- **E. Alat**, M. Brova, I. Younker, A. T. Motta, M. Fratoni, and D. E. Wolfe, High Temperature Performance and Neutronic Analysis of TiN/Doped TiAlN Coatings on ZIRLO® (in preparation).
- M. Brova, **E. Alat**, R. Sherbondy, M. A. Pauley, A.T. Motta, and D. E. Wolfe, Ytterbium-Doped Titanium Aluminum Nitride coatings for nuclear fuel cladding (submitted to Surf. Coat. Technol., 2017).
- S. A. Ebrahim, **E. Alat**, V. Fudurich, F. A. Sohag, F.-B. Cheung, S. M. Bajorek, K. Tien, and C. L. Hoxie, An experimental investigation of the effects of surface conditions on pool-boiling heat transfer for various materials, conference paper, The 17<sup>th</sup> International Topical Meeting on Nuclear Reactor Thermal Hydraulics (NURETH-17), China (in press).
- **E. Alat**, A.T. Motta, R. J. Comstock, J. M. Partezana, and D. E. Wolfe, Multilayer ceramic coating for corrosion (C3) resistance of nuclear fuel cladding, Materials Science and Technology (MS&T16), conference paper, October 2016, Salt Lake City, Utah, USA.
- **E. Alat**, A.T. Motta, R. J. Comstock, J. M. Partezana, and D. E. Wolfe, Multilayer (TiN, TiAlN) ceramic coatings for nuclear fuel cladding, J. Nucl. Materials 478 (2016) 236-244.
- **E. Alat**, A.T. Motta, R. J. Comstock, J. M. Partezana, and D. E. Wolfe, Ceramic coating for corrosion (C3) resistance of nuclear fuel cladding, Surf. Coat. Technol. 281 (2015) 133-143.

## SELECT PRESENTATIONS

- **E. Alat**, A.T. Motta, R. J. Comstock, J. M. Partezana, and D. E. Wolfe, Effect of substrate surface preparation on corrosion performance of multilayer (TiN, TiAlN) coatings, Nuclear Materials (NuMat16), poster presentation, November 2016, Montpellier, France.
- **E. Alat**, A.T. Motta, R. J. Comstock, J. M. Partezana, and D. E. Wolfe, Multilayer ceramic coating for corrosion (C3) resistance of nuclear fuel cladding, Materials Science and Technology (MS&T16), presentation, October 2016, Salt Lake City, Utah, USA.

## LEADERSHIP ACTIVITIES, AWARDS AND HONORS

- **MatSE Representative at the Earth and Minerals Science (EMS) Graduate Council**, December 2016-present.
- **Paper reviews for journals:** Fusion Engineering and Design, Scientific Reports, Journal of Nuclear Materials.
- **PPG Elevator Pitch Competition, 3<sup>rd</sup> Place**, June 2017.
- **Graduate Exhibition Video Competition, 2<sup>nd</sup> Place**, April 2017.
- **iMATSE Graduate Students Travel Award**, May 2016.
- **14<sup>th</sup> Annual Graduate Student Poster Competition, Group Poster Award, 1<sup>st</sup> Place**, April 2016.
- **The EMS Centennial Research Travel Award**, March 2016.

## TECHNICAL SKILLS

### Computer Skills

- Windows 7/8/10
- MS Office
- MS Project
- C Programming Language
- 3D design software: CADKEY, CATIA, Solid works
- CES (Material selection software)
- Crystal Maker
- Thermo-Calc
- Data analysis: Matlab, Origin, TA Universal Analysis, Image J
- Finite element analysis: MSC.Marc Mentat, Abaqus CAE, ANSYS
- XRD analysis: JADE, GSAS

### Mechanical Testing

- Tensile testing, hardness testing

### Sample Preparation

- Cutting, grinding, polishing, etching

### Processing

- Cathodic arc physical vapor deposition
- Sputter coating
- Pressure die casting

### Characterization

- Optical Microscopy
- Scanning Electron Microscopy (SEM)
- Energy Dispersive Spectroscopy (EDS)
- Transmission Electron Microscopy (TEM)
- X-Ray Diffraction (XRD)
- Electron Backscatter Diffraction (EBSD)
- Differential Scanning Calorimetry (DSC)
- Thermogravimetric Analysis (TGA)
- Optical profilometry

### Language Skills

- Turkish – Native language
- English – Advanced