

## **M. KAAAN PEHLİVANOĞLU, Ph.D.,**

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### **EDUCATION**

**Ph.D.** : **Metallurgical and Materials Engineering, Middle East Technical University, Ankara, TURKEY, June 2003.**

Dissertation : Production of Bulk Metallic Glasses

Advisor : Prof. Dr. M. Vedat AKDENİZ

Co-Advisor : Prof.Dr. A. Şakir BOR

**Master of Science** : **Metallurgical and Materials Engineering, Middle East Technical University, Ankara, TURKEY, January 1997.**

Thesis : Assessment of Microstructural Effects on Stress Corrosion Cracking Behavior of 4140 and 4340 Steels in a Caustic Solution

Advisor : Prof. Dr. Filiz SARIOĞLU

**Bachelor of Science** : **Metallurgical and Materials Engineering, Middle East Technical University, Ankara, TURKEY, July 1993.**

- ✓ Graduated from the University as a High Honor Student, having the 2<sup>nd</sup> highest scholastic degree in the Metallurgical and Materials Engineering Department (Cumulative GPA: 3.52 / 4.00).

### **HIGHLIGHTS OF SKILLS**

- ❖ Knowledge of electron microscopy techniques
- ❖ Hands-on experience in scanning electron microscopy (for at least 3 years)
- ❖ Familiarity with X-ray and electron diffraction techniques, EPMA (Electron Probe Micro Analysis), AES (Atomic Emission Spectroscopy) and various other spectroscopic techniques
- ❖ Hands-on experience in inert gas fusion and combustion analysis techniques for the determination of carbon, sulphur, oxygen, nitrogen and hydrogen in inorganic materials
- ❖ Theoretical and practical knowledge of thermal analyses techniques; hands-on experience in differential scanning calorimetry (for at least 6 years) and dilatometry (for at least 3 years)
- ❖ Hands-on experience in various mechanical testing techniques
- ❖ Advanced knowledge of physical metallurgy; knowledge of thermodynamics, mechanical metallurgy, powder metallurgy and fracture mechanics

### **LANGUAGES**

- ❖ ENGLISH; excellent written and oral skills (got 95 out of 100 in Turkish KPDS Examination (Kamu Personeli Yabancı Dil Bilgisi Seviye Tespit Sınavı); 2009 FALL TERM Examination Result)
- ❖ GERMAN; poor (beginner level)

## RESEARCH EXPERIENCE

**Doctoral Research:** Metallurgical and Materials Engineering, Middle East Technical University, Ankara, TURKEY, 1997-2003.

- ❖ Produced bulk metallic glass alloys mainly in Fe-Zr-B and Fe-C-B based alloy systems by using centrifugal casting method. The latter alloy system was developed originally in this study. Investigated the reasons of the high glass forming ability exhibited by the Fe-Zr-B based alloy system in more detail, mainly in terms of the effects of compositional parameters. Used differential scanning calorimetry (DSC), X-ray diffraction (XRD), scanning electron microscopy (SEM) and transmission electron microscopy (TEM) techniques for structural characterization studies.

**Master's Research:** Metallurgical and Materials Engineering, Middle East Technical University, Ankara, TURKEY, 1993-1997.

- ❖ Investigated the effects of microstructural variations on the stress corrosion cracking (SCC) behavior of AISI-SAE 4140 and 4340 low-alloy steels in a caustic environment. Used electrochemical anodic polarization tests, fracture mechanical tests and scanning electron microscopy (SEM) to investigate the SCC behavior.

## WORK EXPERIENCE

**1) RESEARCH ASSISTANT: Metallurgical and Materials Engineering Department, Middle East Technical University, Ankara, TURKEY, 1993-2001.**

### A. Laboratory Responsibilities

- ❖ **Scanning Electron Microscopy Laboratory, 1997-2001**
  - Assisted the lab director Prof. Dr. Bilgehan ÖGEL and operator Mr. Cengiz TAN in all lab related works.
  - Served as the scanning electron microscope operator as required.
  - Prepared the first version of the Scanning Electron Microscopy Lab Web Site.
- ❖ **Mechanical Test Laboratory, 1994-1997**
  - Assisted the lab director Prof. Dr. Rıza GÜRBÜZ in all lab related works.
  - Prepared and delivered the laboratory lectures of the “*Testing and Evaluation of Engineering Materials*” course, given by Prof. Dr. Rıza GÜRBÜZ. Supervised students during laboratory tests. Evaluated and graded lab reports.

### B. Courses Assisted

- ❖ *Phase Transformations, 1999 – 2000.*  
4<sup>th</sup> year undergraduate course given by Prof. Dr. A. Şakir BOR (compulsory course). Main textbook: “*Fundamentals of Physical Metallurgy*”, J. D. VERHOEVEN.
- ❖ *Physical Metallurgy, 1999.*  
3<sup>rd</sup> year undergraduate course given by Prof. Dr. A. Şakir BOR (compulsory course). Main textbook: “*Fundamentals of Physical Metallurgy*”, J. D. VERHOEVEN.
- ❖ *Kinetics of Processes in Materials, 1998.*

Graduate course given by Prof. Dr. Naci SEVİNÇ and Prof Dr. Şakir BOR (compulsory course).

- ❖ *Testing and Evaluation of Engineering Materials, 1994 – 1997.*  
Undergraduate/graduate course given by Prof. Dr. Rıza GÜRBÜZ (elective course).
- ❖ *Mechanical Behavior of Materials, 1994 – 1997.*  
3<sup>rd</sup> year undergraduate course given by Prof. Dr. Alpay Ankara and Prof. Dr. Filiz SARIOĞLU (compulsory course). Main textbook: “*Mechanical Metallurgy*”, G. E. DIETER.
- ❖ *Basic Concepts in Materials Science, 1994 – 1997.*  
2<sup>nd</sup> year undergraduate course given by Prof. Dr. Filiz SARIOĞLU (compulsory course). Oriented for Mechanical and Aeronautical Engineering. Main textbook: “*Materials Science and Engineering: An Introduction*”, W. D. CALLISTER, Jr.
- ❖ *Fracture of Engineering Materials, 1994 – 1997.*  
Undergraduate/graduate course given by Prof. Dr. Filiz SARIOĞLU (elective course).

**2) LECTURER: Metallurgical and Materials Engineering Department, Middle East Technical University, Ankara, TURKEY, Spring 2014.**

#### **A. Courses Lectured**

- ❖ *Fundamentals of Materials Science and Engineering (METE 230), 2014.*  
2<sup>nd</sup> year undergraduate course (compulsory course). Oriented for Industrial Engineering (compulsory course). Main textbook: “*Materials Science and Engineering: An Introduction*”, W. D. CALLISTER, Jr.

**3) CHIEF RESEARCH ENGINEER: TÜBİTAK SAGE (TÜBİTAK Savunma Sanayii Araştırma ve Geliştirme Enstitüsü), Materials Technologies Division, Ankara, TURKEY, 2004 - Present**

- ❖ Has been and is being involved in several research and development projects related to the defense industry, with a main focus on guided missiles and munitions (**detailed description of the involved projects unavailable owing to confidentiality requirements**)
- ❖ Within the involved projects, has taken part as a Chief Research Engineer dealing primarily with materials related issues
- ❖ Has gained expertise in the use of various engineering materials in defense industry applications. Engineering materials mainly dealt with include: a) infrared optical materials, b) various kinds of steels, c) cast/wrought alloys based on aluminum, titanium, lithium etc., d) refractory metallic materials (like tungsten) and their alloys, and e) various metal/ceramic/polymer based composite materials
- ❖ Has actively been involved in the design, construction and development of a materials research and development laboratory facility, which is located within TUBITAK SAGE premises. The laboratory facility has constantly been expanded and developed over the years, and has now reached such a mature state that certain defense industry related materials research and development studies can be carried out efficiently within the facility. The laboratory facility is equipped with several manufacturing and

characterization instruments, such as vacuum arc and vacuum induction melting/casting machines, various muffle and tube furnaces with varying charge capacity (majority of them having atmosphere control capability), lab-scale thermo-mechanical processing machines (swager, rolling mill etc.), various powder mixing/comminuting/pressing equipment, metallographic preparation/examination equipment, glove boxes, fume hoods, various spectroscopic and thermal analysis equipment etc. **(detailed description of the laboratory facility unavailable owing to confidentiality requirements)**

- ❖ Has gained hand-on experience in using most of the above-mentioned laboratory equipments

## **PUBLICATIONS**

### **A. Refereed Journal Articles**

- ❖ O. Dinçer, M. K. Pehlivanoğlu, N. K. Çalışkan, A. Kalkanlı, İ. Karakaya, "Processing and Microstructural Characterization of Liquid Phase Sintered Tungsten-Nickel-Cobalt Heavy Alloys", *International Journal of Refractory Metals and Hard Materials*, **50**, 106, 2015.
- ❖ M. V. Akdeniz, A. O. Mekhrabov, M. K. Pehlivanoğlu, "Solidification Behavior of Bulk Glass-Forming Alloy Systems", *Journal of Alloys and Compounds*, **386**, 185, 2005.
- ❖ M. K. Pehlivanoğlu, M. V. Akdeniz, A. Ş. Bor, "Structural Characterization of Iron-Based Bulk Metallic Glass Alloys Produced by Centrifugal Casting", *Chemical Engineering Communications*, **190**, (5-8), 925, 2003.

### **B. Conference Presentations and Proceedings**

- ❖ O. Dinçer, M.K. Pehlivanoğlu, F.A. Dericioğlu, "Effects of Different Mechanical Alloying Parameters on Microstructure of High Temperature Nanocrystalline Cu-Ta Alloys", *19<sup>th</sup> International Metallurgy and Materials Congress*, İstanbul, Turkey, 2018.
- ❖ O. Dinçer, M.K. Pehlivanoğlu, "Microstructural Characteristics of Molybdenum-Alloyed Liquid-Phase Sintered W-Ni-Co Heavy Alloys", *POWDERMET2017 International Conference on Powder Metallurgy and Particulate Materials*, Las Vegas, USA, 2017.
- ❖ O. Dinçer, M.K. Pehlivanoğlu, F.A. Dericioğlu, "High Strength Copper Alloys for Extreme Temperature Conditions", *18<sup>th</sup> International Metallurgy and Materials Congress*, İstanbul, Turkey, 2016.
- ❖ O. Dinçer, M.K. Pehlivanoğlu, "The Effects of Mo Addition on Microstructural Characteristics of W-Ni-Co Heavy Alloys", *18<sup>th</sup> International Metallurgy and Materials Congress*, İstanbul, Turkey, 2016.
- ❖ O. Dinçer, A. Kalkanlı, İ. Karakaya, M. K. Pehlivanoğlu, N. K. Çalışkan, "Sintering Studies on W-Rich W-Ni-Co Heavy Alloys With High Cobalt/Nickel Ratio", *17<sup>th</sup> International Metallurgy and Materials Congress*, İstanbul, Turkey, September 2014.
- ❖ O. Dinçer, A. Kalkanlı, İ. Karakaya, M. K. Pehlivanoğlu, "Variation of Microstructure and Hardness with Composition in W-Rich Ternary W-Ni-Co Alloys", *17<sup>th</sup> International Metallurgy and Materials Congress*, İstanbul, Turkey, September 2014.

- ❖ O. Dinçer, A. Kalkanlı, İ. Karakaya, M. K. Pehlivanoğlu. "The Effect of Sintering Temperature And Tungsten Content on the Microstructural Characteristics of W-Rich W-Ni-Co Heavy Alloys", *17<sup>th</sup> International Metallurgy and Materials Congress*, İstanbul, Turkey, September 2014.
- ❖ O. Dinçer, A. Kalkanlı, İ. Karakaya, M. K. Pehlivanoğlu, "The Effects of Nickel-Cobalt Ratio on the Characteristics of Tungsten-Nickel-Cobalt Heavy Alloys", *7<sup>th</sup> International Powder Metallurgy Conference and Exhibition*, Ankara, Turkey, June 2014.
- ❖ O. Dinçer, N. K. Çalışkan, M. K. Pehlivanoğlu, N. Durlu, "The Effect of Binder Matrix Phase Composition on the Properties of Tungsten Based Heavy Alloys", *7<sup>th</sup> International Powder Metallurgy Conference and Exhibition*, Ankara, Turkey, June 2014.
- ❖ M. K. Pehlivanoğlu, "Liner Materials Used in Shaped Charge And Explosively Formed Penetrator Applications", *15<sup>th</sup> International Metallurgy and Materials Congress*, İstanbul, Turkey, November 2010, Congress Papers E-Book, 477.
- ❖ F. Yaşar, M. K. Pehlivanoğlu, A. Ş. Bor, "The Effect of Thermo-Mechanical Processing on The Shape Memory Characteristics of A Ti-50Ni Alloy Tested under Constant Strain Free Recovery Conditions", *15<sup>th</sup> International Metallurgy and Materials Congress*, İstanbul, Turkey, November 2010, Congress Papers E-Book, 1166.
- ❖ F. Yaşar, M. K. Pehlivanoğlu, A. Ş. Bor, "The Effect of Thermo-Mechanical Processing on The Shape Memory Characteristics of A Ti-50Ni Alloy Tested under Constant Stress Free Recovery Conditions", *15<sup>th</sup> International Metallurgy and Materials Congress*, İstanbul, Turkey, November 2010, Congress Papers E-Book, 1192.
- ❖ F. Yaşar, M. K. Pehlivanoğlu, A. Ş. Bor, "Design of A Testing Machine For The Thermo-Mechanical Characterization of TiNi Shape Memory Alloys", *15<sup>th</sup> International Metallurgy and Materials Congress*, İstanbul, Turkey, November 2010, Congress Papers E-Book, 491.
- ❖ M. K. Pehlivanoğlu, "Kızılötesi Güdümlü Mühimmatlarda Kullanılan Kubbe/Pencere Malzemeleri", Savunma Teknolojileri Kongresi (SAVTEK) 2010, Ankara, Turkey, June 2010, SAVTEK 2010 Değerlendirme Bildirileri, Cilt 2, 159.  
*(Proceeding title in English: "Dome/Window Materials Used in Infrared Guided Weapons")*
- ❖ F. Yaşar, M. K. Pehlivanoğlu, "Çift-Kullanımlı Teknolojilere Örnek Olarak Kristal Büyütme Teknolojilerinin İncelenmesi", Savunma Teknolojileri Kongresi (SAVTEK) 2010, Ankara, Turkey, June 2010, SAVTEK 2010 Değerlendirme Bildirileri, Cilt 2, 167.  
*(Proceeding title in English: "An Evaluation of Crystal Growth Technologies as an Example to Dual-Use Technologies")*
- ❖ M. K. Pehlivanoğlu, N. K. Çalışkan, "Kızılötesi Güdümlü Mühimmatlarda Kubbe/Pencere Uygulamalarında Kullanılan Kızılötesi-Geçirgen Malzemeler ve Üretim Teknolojileri", *14<sup>th</sup> International Metallurgy and Materials Congress*, İstanbul, Turkey, September 2008, Congress E-Book, 1052.

(*Proceeding title in English: "Infrared Transparent Materials and Advanced Manufacturing Technologies Employed in Dome/Window Applications in Infrared Guided Weapons"*)

- ❖ N. K. Çalışkan, M. K. Pehlivanoğlu, A. Ş. Bor, "Yüksek Yoğunluklu W(90 Ağırlık)-Ni-Cu Alaşımlarında Kompozisyon Değişimlerinin Sinterleme Davranışı ve Mikroyapısal Özellikler Üzerindeki Etkileri", *14<sup>th</sup> International Metallurgy and Materials Congress*, İstanbul, Turkey, September 2008, Congress E-Book, 810.

(*Proceeding title in English: "Effects of Compositional Variations on the Sintering Behavior and Microstructural Properties of Selected High Density W (90 Wt%)-Ni-Cu Alloys"*)

- ❖ N. K. Çalışkan, Ö. M. Soyer, M. K. Pehlivanoğlu, "Zırh Delici Mühimmatlarda Kullanılan Tungsten Ağır Alaşımlarının (WHA, İng.) Ülkemizdeki ve Dünyadaki Durumunun Değerlendirilmesi", Savunma Teknolojileri Kongresi (SAVTEK) 2008, Ankara, Turkey, June 2008, SAVTEK 2008 Değerlendirme Bildirileri, Cilt 2, 9.

(*Proceeding title in English: "An Evaluation of the State of Tungsten Heavy Alloys (WHAs) Used in Armor-Piercing Munitions in our Country and World"*).

- ❖ N. K. Çalışkan, M. K. Pehlivanoğlu, A. Ş. Bor, "Effect of Composition on the Sintering Behavior and Microstructure of W (90 wt%)-Ni-Cu Alloys", *EURO PM2007*, Toulouse, France, October 2007, EURO PM2007 Proceedings, Vol 2, 399.
- ❖ M. K. Pehlivanoğlu, M. V. Akdeniz, "The Effect of Composition on the Bulk Glass Forming Ability (BGFA) of Iron-Rich Fe-Zr-B Bulk Amorphous Alloys", *12<sup>th</sup> International Metallurgy and Materials Congress*, İstanbul, Turkey, September 2005, Congress E-Book, 2212.
- ❖ M. K. Pehlivanoğlu, M. V. Akdeniz, "The Effects of Mo, W And Co Additions on the Glass Forming Ability of Fe-Zr-B Based Bulk Metallic Glass Alloys", *12<sup>th</sup> International Metallurgy and Materials Congress*, İstanbul, Turkey, September 2005, Congress E-Book, 1574.
- ❖ M. K. Pehlivanoğlu, M. V. Akdeniz, A. Ş. Bor, "Production of Iron-based Bulk Metallic Glass Alloys By Centrifugal Casting Method", *11<sup>th</sup> International Metallurgy and Materials Congress*, İstanbul, Turkey, June 2002, Proceedings E-Book, 1529.
- ❖ M. K. Pehlivanoğlu, M. V. Akdeniz, A. Ş. Bor, "Investigation of Glass Forming Ability of Fe<sub>60</sub>Co<sub>8</sub>Zr<sub>10</sub>Mo<sub>5</sub>W<sub>2</sub>B<sub>15</sub> Alloy by Thermal Analyses", *11<sup>th</sup> International Metallurgy and Materials Congress*, İstanbul, Turkey, June 2002, Proceedings E-Book, 995.
- ❖ M. K. Pehlivanoğlu, B. Yazgan, M. V. Akdeniz, A. O. Mekhrabov, "Investigation on Solidification Kinetics of Bulk Amorphous Materials by Differential Scanning Calorimetry", *11<sup>th</sup> International Metallurgy and Materials Congress*, İstanbul, Turkey, June 2002, Proceedings E-Book, 1535.
- ❖ M. K. Pehlivanoğlu, F. Sarıoğlu, "Fracture Characteristics of AISI-SAE 4140 and 4340 Steels Subjected to Stress Corrosion Cracking in a Caustic Solution", *Proceedings of 13<sup>th</sup> International Electron Microscopy Congress*, Ankara, Turkey, September 1997, 715.
- ❖ M. K. Pehlivanoğlu, F. Sarıoğlu, "4140 ve 4340 Çeliklerinin Kostik Bir Ortamdaki Gerilimli Korozyon Davranışı Üzerine İy Yapısal Etkilerin İncelenmesi", *9<sup>th</sup> International*

*Metallurgy and Materials Congress, İstanbul, Turkey, June 1997, Proceedings Book, 165.*

*(Proceeding title in English: "Assessment of Microstructural Effects on Stress Corrosion Cracking Behavior of 4140 and 4340 Steels in a Caustic Solution")*

## **PROFESSIONAL AFFILIATIONS**

- ❖ UCTEA Chamber of Metallurgical Engineers

## **REFERENCES**

- ❖ Prof. Dr. Arcan F. DERİCİOĞLU, Metallurgical and Materials Engineering Department, Middle East Technical University
- ❖ Prof. Dr. M. Vedat AKDENİZ, Metallurgical and Materials Engineering Department, Middle East Technical University
- ❖ Prof. Dr. Kadri AYDINOL, Metallurgical and Materials Engineering Department, Middle East Technical University