

Biographical Sketch

Thomas John Balk, PhD, PE

Professional Preparation

University of California, Berkeley	Materials Science & Engineering	B.S. 1995
University of California, Berkeley	Mechanical Engineering	B.S. 1995
The Johns Hopkins University	Materials Science & Engineering	M.S. 1997
The Johns Hopkins University	Materials Science & Engineering	Ph.D. 2000
Max Planck Institute for Metals Research Stuttgart, Germany	Postdoc area: Thin Film Plasticity	2000-2002

Appointments

2015-present	Professor, Chemical and Materials Engineering, University of Kentucky
2010-2015	Associate Professor, Chemical and Materials Engineering, Univ. of Kentucky
2009-present	Registered Professional Engineer in the Commonwealth of Kentucky
2004-2010	Assistant Professor, Department of Chemical and Materials Engineering University of Kentucky, Lexington, KY
2002-2004	Staff Scientist, Department headed by Prof. Eduard Arzt Max Planck Institute for Metals Research, Stuttgart, Germany

Five Products Most Related to this Proposal

- 1) N.J. Briot and T.J. Balk, “*Developing Scaling Relations for the Yield Strength of Nanoporous Gold*”, *Philosophical Magazine*, **95**, pp. 2955-2973 (2015).
- 2) N.J. Briot, T. Kennerknecht, C. Eberl and T.J. Balk, “*Mechanical Properties of Bulk Single Crystalline Nanoporous Gold Investigated by Millimetre-Scale Tension and Compression Testing*”, *Philosophical Magazine*, **94**, pp. 847-866 (2014).
- 3) L. Wang and T.J. Balk, “*Using Multilayer Precursors to Create Nanoporous Gold and Nanoporous Iridium Thin Films with Layered Architecture*”, *Metallurgical and Materials Transactions A*, **45**, pp. 1096-1100 (2014).
- 4) L. Wang, N.J. Briot, P.D. Swartzentruber and T.J. Balk, “*Magnesium Alloy Precursor Thin Films for Efficient, Practical Fabrication of Nanoporous Metals*”, *Metallurgical and Materials Transactions A*, **45**, pp. 1-5 (2014).
- 5) Y. Sun, J. Ye, A.M. Minor and T.J. Balk, “*In Situ Indentation of Nanoporous Gold Thin Films in the Transmission Electron Microscope*”, *Microscopy Research and Technique*, **72**, pp. 232-241 (2009).

Five Other Significant Products

- 1) Y. Sun, K.P. Kucera, S.A. Burger and T.J. Balk, “*Microstructure, Stability and Thermomechanical Behavior of Crack-Free Thin Films of Nanoporous Gold*”, *Scripta Materialia*, **58**, pp. 1018-1021 (2008).
- 2) Y. Sun and T.J. Balk, “*A Multi-Step Dealloying Method to Produce Nanoporous Gold with No Volume Change and Minimal Cracking*”, *Scripta Materialia*, **58**, pp. 727-730 (2008).
- 3) Y. Sun, J. Ye, Z. Shan, A.M. Minor and T.J. Balk, “*The Mechanical Behavior of Nanoporous Gold Thin Films*”, *JOM*, **59**, pp. 54-58 (2007).
- 4) T.J. Balk, G. Dehm and E. Arzt, “*Parallel Glide: Unexpected Dislocation Motion Parallel to the Substrate in Ultrathin Copper Films*”, *Acta Materialia*, **51**, pp. 4471-4485 (2003).
- 5) T.J. Balk and K.J. Hemker, “*High Resolution Transmission Electron Microscopy of Dislocation Core Dissociations in Gold and Iridium*”, *Philosophical Magazine A*, **81**, pp. 1507-1531 (2001).

Synergistic Activities

- Meeting Chair for the 2015 Fall Meeting of the Materials Research Society. Along with the other four meeting chairs, responsible for developing the complete scientific/technical program of this major international meeting, as well as overseeing financial and other aspects of the meeting.
- Chair of 2012 Gordon Research Conference on Thin Film and Small-Scale Mechanical Behavior (Vice-Chair in 2010). Lead organizer for Materials Research Society symposia: “Electron Microscopy Across Hard and Soft Materials” (Fall 2006) and “Linking Length Scales in the Mechanical Behavior of Materials” (Spring 2005). Co-organizer for “Nano- and Microscale Materials: Mechanical Properties and Behavior Under Extreme Environments” (Fall 2008).
- Volume organizer for the Materials Research Society, for articles appearing in 2010. Along with three other scientists chosen by the MRS president, select and develop themes for topical issues of the MRS Bulletin (the society’s monthly publication).
- Faculty advisor to Material Advantage Student Chapter at UK (since Fall 2005). Monthly meetings with PI in a non-classroom setting allow students to learn about new engineering opportunities.
- Worked with the UK College of Engineering and the University of Karlsruhe to establish a German Engineering Exchange program that allows undergraduate students to complete coursework and laboratory research at each host university. Materials Engineering was the pilot program at UK.