

Contents

Preface	ix
Introduction	xi

THERMAL AND MECHANICAL PROPERTIES OF THERMAL BARRIER COATINGS

Thermal and Mechanical Properties of Zirconia Coatings Produced by Electrophoretic Deposition	3
Bernd Baufeld, Omer van der Biest, and Hans-Joachim Rätzer-Scheibe	
Elastic and Inelastic Deformation Properties of Free Standing Ceramic EB-PVD Coatings	11
Marion Bartsch, Uwe Fuchs, and Jianmin Xu	
Thermal and Mechanical Properties of Zirconia/Monazite-Type LaPO ₄ Nanocomposites Fabricated by PECS	19
Seung-Ho Kim, Tohru Sekino, Takafumi Kusunose, and Ari T. Hirvonen	
Corrosion Behavior of New Thermal Barrier Coatings	27
R. Vaßen, D. Sebold, and D. Stover	

MICROSTRUCTURAL CHARACTERIZATION OF THERMAL BARRIER COATINGS

Monitoring the Phase Evolution of Yttria Stabilized Zirconia in Thermal Barrier Coatings Using the Rietveld Method	41
G. Witz, V. Shklover, W. Steurer, S. Bachegowda, and H.-P. Bossmann	
Thermal Imaging Characterization of Thermal Barrier Coatings	53
J.G. Sun	

Examination on Microstructural Change of a Bond Coat in a Thermal Barrier Coating for Temperature Estimation and Aluminum-Content Prediction	61
Mitstutoshi Okada, Tohru Hisamatsu, and Takayuki Kitamura	
Quantative Microstructural Analysis of Thermal Barrier Coatings Produced by Electron Beam Physical Vapor Deposition	71
Matthew Kelly, Jogender Singh, Judith Todd, Steven Copley, and Douglas Wolfe	
Investigation of Damage Prediction of Thermal Barrier Coating	81
Y. Ohtake	
ENGINEERING OF THERMAL PROPERTIES OF THERMAL BARRIER COATINGS	
Effect of an Opaque Reflecting Layer on the Thermal Behavior of a Thermal Barrier Coating	87
Charles M. Spuckler	
Optimizing of the Reflectivity of Air Plasma Sprayed Ceramic Thermal Barrier Coatings	99
A. Stuke, R. Carius, J.-L. Marques, G. Mauer, M. Schulte, D. Sebold, R. Vaßen, and D. Stover	
Thermal Conductivity of Nanoporous YSZ Thermal Barrier Coatings Fabricated by EB-PVD	115
Byung-Koog Jang and Hideaki Matsubara	
COATINGS TO RESIST WEAR, EROSION, AND TRIBOLOGICAL LOADINGS	
Reduction of Wear by a TiBN Multilayer Coating	127
6.-A. Behrens, A. Küper, M. Bistrone, Fr.-W. Bach, K. Möhwald, and T.A. Deißer	
Characteristics of TiN/CrN Multilayer Coatings with TiCrN and CrTiN Interlayer	135
Xingbo Liu, Chengming Li, Jing Xu, Weizhong Tang, and Fanxiu Lv	
Development of a Duplex Coating Procedure (HVOF and PVD) on Ti-6AL-4V Substrate for Automotive Applications	145
E. Bemporad, M. Sebastiani, F. Carassiti, F. Casadei, and R. Valle	
Novel Coatings of Cemented Carbides by an Improved HVOF Spraying Process	159
Makoto Watanabe, Pornthep Chivavibul, Jin Kawakita, and Seiji Kuroda	
Fracture Mechanics Analysis of Coatings Under Contact Load	167
Yumei Bao, Guozhong Chai, and Weinan Hao	

COATINGS FOR SPACE APPLICATIONS

Heat Treatment of Plasma-Sprayed Alumina: Evolution of Microstructure and Optical Properties Keith S. Caruso, David G. Drewry, Don E. King, and Justin S. Jones	177
Porous Ceramic Foam Catalysts for N ₂ O-Based Satellite Microthrusters F. Ahmed, L. Courtney, J.R. Wallbank, and P.A. Sermon	193

MULTIFUNCTIONAL COATINGS, NANOSTRUCTURED COATINGS, AND INTERFACES PHENOMENA

Development of Multi-Layered EBC for Silicon Nitride Ceramics Shunkichi Ueno, Tatsuki Ohji, and Hua -Tay Lin	205
Reactive Bonding of Sapphire Single Crystal to Tungsten-Copper Metal Composite Using Directed Vapor Deposition Process Y.T. Peng, D. D. Hass, and Y.V. Murty	209
Protective Coating on Metals Using Chromium-Free Organic-Inorganic Silica Hybrid Aqueous Solution Satomi Ono and Hiroyasu Tsuge	219
An Energy Model of Segmentation Cracking of SiO _x Thin Film on a Polymer Substrate Marcin Bialas and Zenon Mroz	231
Effect of Withdrawal Speed on Thickness and Microstructure of 8MOL%Yttria Stabilized Zirconia Coatings on Inorganic Substrates Srinivasa Rao Boddapati and Rajendra K. Bordia	243
Author Index	253