

Table of Contents

Preface

Chapter 1: Fabrication and Processing of Porous Metals and Metallic Foams

Sandwich Manufacturing with Foam Core and Aluminum Face Sheets – A New Process without Rolling J. Hohlfeld, T. Hipke and F. Schuller	3
The Effect of Sintering Condition on Microstructural and Mechanical Properties of Porous Nickel A. Salehi, A. Moloodi, F. Barzegar and J. Mirabbasi	11
On the Role of both Vacuum System and Initial Size on Fabrication of Aluminum-LECA Composite Foam A. Moloodi and M.R. Moradi	17
Structural Transformation of Bilayer Ferro-Foams Caused by Magnetic Field H.Q. Dong, J. Liang, F.Y. Li, C.C. Zhang, S.B. Wang and Z.S. Lei	22
Investigation on Relationship between Spacer Content and Porosity of Steel Foams H.M. Wang, M.Z. Su and C. Chen	32
Fabrication, Structure and Property of Copper Foam C.Q. Guo, Y.D. Sun, Y. Zhou, B. Xie, T.Y. Wang and X.Q. Zuo	41
Fabrication, Properties and Applications of Porous Metals with Directional Pores H. Nakajima and T. Ide	49
Preparation and Sound Absorption Coefficient Test of Aluminum Foam with CaO Granules Infiltrating Agent y. zhang, Z.M. Chen, Z.J. Wang and J.H. Liu	55
Fabrication of Lead-Foam by Infiltration Casting X.L. Liang, H.J. Luo, X.T. Ma, Z.G. Zhang and J.R. Xu	61
Effects of Modification and Heat Treatment on Microstructure and Mechanical Property of Two-Step Foamed ZL111 Alloy Foam Y.Y. Jiang, X.X. Luo, Q. Chen, M.W. Zhao, J.S. Lu, Y. Zhou and X.Q. Zuo	68
Porous Titanium Fabricated by a Combination of Vacuum Distillation and Sintering Process X.T. Lu, H.J. Luo, W. Yin, L.L. Wu and Q.L. He	78
A Novel Method for Preparation of Aluminum Foam Sandwich Panels H. Lin, H.J. Luo, J.K. Zhang, Z.K. Cao and J. Xu	86
Influence of Material and Arrangement Mold on the Foaming Behavior of Extruded Precursor F. Wang and L.C. Wang	92
Fabrication and Compression Investigation of the Ordered Porous Aluminum with Cubic Pores H. Wang, Y. Fu, M.M. Su and H. Hao	97
Influence of Ambient Pressure on Cell Structure Evolution in Liquid Aluminum Foam Z.K. Cao, Y. Yu and M. Li	106
The Introduction of Thin Open-Cell Metal Foams and their Wider Engineering Applications Z. shi and J.A. Szpunar	112
Physical Simulation of Solid Liquid Mixture Stability in Molten Aluminum H.J. Luo, Y.L. Liu, L. Zhang, Y.H. Liu and C. Liu	123
The Processing and Structure of Steel Matrix Syntactic Foams Prepared by Infiltration Casting Q.Z. Yang, Y.P. Wei, Z.Q. Miao, P. Gao and B. Yu	129
Theoretical Analysis of Porosity in an Ordered Porous Copper Fabricated by Continuous Unidirectional Solidification R. Cao and Q.L. Jin	136

Effects of Heat Treatment on Compressive Behavior of Porous Aluminum Manufactured by SLM

Y. Sugiyama, T. Miura and K. Kitazono 142

The Ordered Porous Aluminum: Modeling, Preparation, and Properties with Designed Structures

H. Hao, H. Wang and K.Y. Li 148

Chapter 2: Properties of Porous Metals and Metallic Foams

Thermal Conductivity Measurements of Novel Porous Copper Fiber Sintered Sheet

R.L. Liu, W. Zhou, W.S. Ling, S.L. Li and P. He 159

Evaluation of Local Strain Distribution during Compressive Deformation of Open-Cell Porous Metals

K. Maruyama, X.Z. Yue and K. Kitazono 169

Microstructure and Compressive Properties of Al/Al₂O₃ Syntactic Foams

M.M. Su, H. Wang, K.Y. Li and H. Hao 174

Observation of Gas Pores inside the Columnar Grains of a Lotus Type Porous Copper

S.L. Li and Q.L. Jin 182

The Dynamic Response of Sandwich Structures with Cellular Metallic Core under Blast Loading

Y.C. Guo and G.P. Zhao 188

The Compressive Properties of Open-Cell Zn-22Al Foams with Spheroidal Pore at Different Temperatures

J.A. Liu, Q.X. Qu, Z.B. Zheng and T.Y. Zhang 196

Impact Toughness of Closed-Cell Aluminum Foam

Y.L. Mu, D.D. Wang, Y.D. He and G.C. Yao 203

Quasi-Static Crushing of Aluminum Foam-Filled Thin-Walled Aluminum Tubes

Y. Yu, Z.K. Cao, M. Li and H.J. Luo 209

Influence of Cell Morphology on the Compressive Deformation Behavior of Aluminum Foams

M. Li, Z.K. Cao, Y. Yu, H.J. Luo, J.C. Shi, L.P. Zhou and G.C. Yao 215

Structural Loading of Cellular Metals: Damage Mechanisms and Standardization Concepts

U. Krupp, T. Hipke and S. Nesic 220

Sulfidation Resistance of Porous FeCrAl Alloy

P. Tan, A. LI, J.M. Chen, Z.F. Li and Y. Ge 226

Study on Mechanical Properties of Monel Porous Plate Used for Distributing Gas

Y. Ge, P. Tan, Z.F. Li, J.Y. Wang, Q.B. Wang and B.J. Yang 234

Compressive Behavior and Deformation Characteristic of Al-Based Auxetic Lattice Structure Filled with Silicate Rubber

Y.Y. Xue, X.F. Wang, X.F. Wang and F.S. Han 240

Quasi-Static and Impact Response of Graded Aluminium Matrix Syntactic Foams

C. Liang and Y.Y. Zhao 246

Numerical Simulations and Experimental Studies on the Quasi-State Axial Compression Behavior of Steel-Based Porous Materials

Y.P. Wei, Q.Z. Yang, P. Gao, Z.Q. Miao, J.C. Cheng, X. Sun and B. Yu 256

Formation Mechanism and Properties of Thickness-Controllable Tungsten Coating on Diamond Surface by Salt Bath Plating

Y.H. Dong, R.Q. Zhang, L. Zhou, A.M. Chu, T.G. Luo, D.Z. Chen, Q.J. Chen, Z.G. Ye and B.L. Zhang 264

Chapter 3: Porous and Nanoporous Biomaterials

Mechanical Evaluation of Titanium Scaffolds for Orthopedic Implants

A. Salehi, H. Amini Mashhadi, M.S. Abravi, F. Baezegar, S. Nokhasteh and M. Mahdavi 277

Magnesium-Based Foam Biomaterials and their Related Properties

W.Z. Huang, H.J. Luo, L. Zhang, Y.L. Mu and X. Cui 282

Human Bone Inspired Design of an Mg Alloy-Based Foam	291
V.M. Posada, C. Orozco, J.F. Ramirez Patino and P. Fernandez-Morales	
Mechanical Response of Nano-Porous Copper under Different Temperature and Strain Rate through Molecular Dynamics Simulations	297
S.Y. Wei, C.W. Yao, L. Wang and D.H. Yang	
Biocompatibility of Titanium Implants with Porous Surface Fabricated by Micromachining	304
H. Nakajima, Y. Higuchi, K. Takahashi and H. Komasa	
Relationship between Elastic Module and Porous Structure of Cancellous Bone	309
Y.H. Du, S.Y. He, M.K. Huo, P. Zhou, Q. Chen, N.R. Bao and L. Ba	
Antimicrobial Effect of Lotus-Type Porous Copper	314
H. Nakajima, K. Yasunaga, R. Yamagishi and S. Matsuda	

Chapter 4: Energy Absorption and other Applications of Porous Metals and Metallic Foams

Energy Absorption Efficiency of Open-Cell Carbon Foams	323
F. Asai, H. Fukazawa and K. Kitazono	
Energy Absorbing Properties of the Cellular Structures with Different Wall Thickness, Produced by the Selective Laser Melting	330
P.A. Kuznetsov, A. Deev, M. Staritcyn, A.Z. Zhukov and V.V. Bobyr	
Impact Energy Absorbing System for Space Lander Using Hemispherical Open-Cell Porous Aluminum	337
K. Kitazono, R. Tada, Y. Sugiyama and T. Miura	
Metal-Foam Bipolar Plate for PEM Fuel Cells: Simulations and Preliminary Results	342
Y. Awin and N. Dukhan	
Numerical Simulation on the Compression Property in Different Face Sheet of Sandwich Panel Combined with Aluminum Foam	351
Y.L. Wang, K.N. Tian, H. Xu and L.C. Wang	
The Sound Absorption Properties Comparison of Metal Foams and Flexible Cellular Materials	357
L.S. Liang, X.L. Wu, N.N. Ma, J.J. Du and M.B. Liu	
Sound Absorption Properties of Stainless Steel Fiber Porous Materials before/after Corrosion	367
Q.B. Ao, J.Z. Wang, J. Ma and Y. Ge	
Experimental Study of Acoustic Performance of Porous Metals at High Temperatures	373
J.Z. Zhang, X.P. Wang, B. Zhang and L.H. Zhang	
Heat Transfer Performance of LCS Porous Copper with Different Structural Characteristics	380
K.K. Diao, X.K. Lu, Z.N. Wu and Y.Y. Zhao	