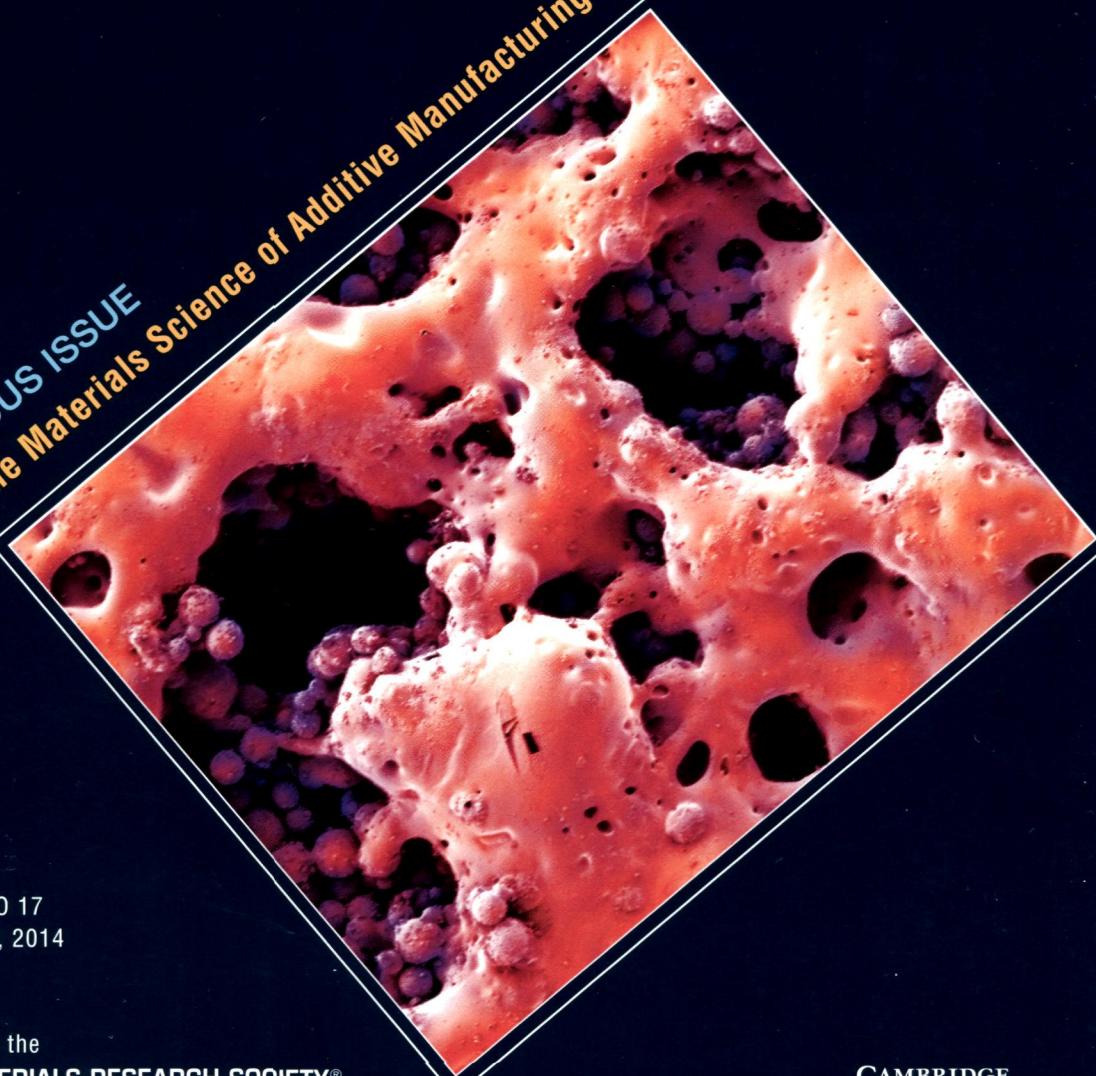


MU
J80/mrs



Journal of MATERIALS RESEARCH

FOCUS ISSUE
The Materials Science of Additive Manufacturing



VOLUME 29 • NO 17
SEPTEMBER 14, 2014

A publication of the

MRS MATERIALS RESEARCH SOCIETY®
Advancing materials. Improving the quality of life.

CAMBRIDGE
UNIVERSITY PRESS

Journal of MATERIALS RESEARCH

Volume 29, Number 17, September 14, 2014

THE MATERIALS SCIENCE OF ADDITIVE MANUFACTURING

1791 Introduction

Todd A. Palmer, Jens Günster,
Daniel Günther

POLYMERS

REVIEWS

1792–1816 Additive nanomanufacturing – A review

D.S. Engstrom, B. Porter,
M. Pacios, H. Bhaskaran

1817–1823 Nanostructural characterization of carbon nanotubes in
laser-sintered polyamide 12 by 3D-TEM

Jiaming Bai, Ruth D. Goodridge,
Richard J.M. Hague, Mo Song,
Hideyuki Murakami

INVITED PAPERS

1824–1832 Materials perspective of polymers for additive manufacturing
with selective laser sintering

Manfred Schmid, Antonio Amado,
Konrad Wegener

1833–1840 Compact polymeric 3D prints of high stability

Goetz Peter Hellmann,
Christoph Kottlorz, Jonas Presser,
Katja Utaloff

ARTICLES

1841–1851 Aging behavior of thermoplastic elastomers in the laser
sintering process

Stefan Ziegelmeier,
Frank Wöllecke,
Christopher J. Tuck,
Ruth D. Goodridge,
Richard J.M. Hague

1852–1858 Investigating the behavior of laser-sintered Nylon 12 parts
subject to dynamic loading

Hoda Amel, Hadi Moztarzadeh,
Jem Rongong, Neil Hopkinson

1859–1866 Novel ABS-based binary and ternary polymer blends for material
extrusion 3D printing

Carmen R. Rocha,
Angel R. Torrado Perez,
David A. Roberson,
Corey M. Shemelya,
Eric MacDonald, Ryan B. Wicker

1867–1875 Tunability and enhancement of mechanical behavior with
additively manufactured bio-inspired hierarchical suture
interfaces

Erica Lin, Yaning Li,
James C. Weaver, Christine Ortiz,
Mary C. Boyce

1876–1882 Nonisotropic experimental characterization of the relaxation
modulus for PolyJet manufactured parts

David Blanco, Pelayo Fernandez,
Alvaro Noriega

1883–1892 Selective laser sintering of polymer biocomposites based on
polymethyl methacrylate

Rajkumar Velu, Sarat Singamneni

1893–1898 The importance of carbon fiber to polymer additive
manufacturing

Lonnie J. Love, Vlastamil Kunc,
Orlando Rios, Chad E. Duty,
Amelia M. Elliott, Brian K. Post,
Rachel J. Smith, Craig A. Blue

(Continued)

METALS**ARTICLES**

- 1899–1910 **Compositionally graded metals: A new frontier of additive manufacturing** Douglas C. Hofmann, Joanna Kolodziejska, Scott Roberts, Richard Otis, Robert Peter Dillon, Jong-Ook Suh, Zi-Kui Liu, John-Paul Borgonia
- 1911–1919 **On the fatigue properties of metals manufactured by selective laser melting – The role of ductility** Stefan Leuders, Tobias Lieneke, Stefan Lammers, Thomas Tröster, Thomas Niendorf

INVITED PAPERS

- 1920–1930 **Thermal effects on microstructural heterogeneity of Inconel 718 materials fabricated by electron beam melting** William J. Sames, Kinga A. Unocic, Ryan R. Dehoff, Tapasvi Lolla, Sudarsanam S. Babu
- 1931–1940 **Studies on thermoplastic 3D printing of steel–zirconia composites** Uwe Scheithauer, Anne Bergner, Eric Schwarzer, Hans-Jürgen Richter, Tassilo Moritz

ARTICLES

- 1941–1950 **Comparative study of microstructures and mechanical properties of in situ Ti–TiB composites produced by selective laser melting, powder metallurgy, and casting technologies** H. Attar, M. Bönisch, M. Calin, L.C. Zhang, K. Zhuravleva, A. Funk, S. Scudino, C. Yang, J. Eckert
- 1951–1959 **Beam speed effects on Ti–6Al–4V microstructures in electron beam additive manufacturing** Xibing Gong, James Lydon, Kenneth Cooper, Kevin Chou
- 1960–1969 **Selective laser melting additive manufacturing of TiC/Inconel 718 bulk-form nanocomposites: Densification, microstructure, and performance** Qingbo Jia, Dongdong Gu
- 1970–1977 **Transmission electron microscopy of an ultrasonically consolidated copper–aluminum interface** Jennifer M. Sietins, John W. Gillespie, Suresh G. Advani
- 1978–1986 **Characterization of microstructure and residual stress in a 3D H13 tool steel component produced by additive manufacturing** Ryan Cottam, James Wang, Vladimir Luzin
- 1987–1996 **Additive manufacturing of nickel-based superalloy Inconel 718 by selective electron beam melting: Processing window and microstructure** Harald Ernst Helmer, Carolin Körner, Robert Friedrich Singer
- 1997–2005 **Selective laser sintering of composite copper–tin powders** David C. Walker, William F. Caley, Mathieu Brochu
- 2006–2020 **Tensile properties of laser additive manufactured Inconel 718 using filler wire** Yi-Nan Zhang, Xinjin Cao, Priti Wanjara, Mamoun Medraj
- 2021–2027 **Laser-deposited CoCrMo alloy: Microstructure, wear, and electrochemical properties** Kedar M. Mantrala, Mitun Das, Vamsi K. Balla, Ch. Srinivasa Rao, V.V.S. Kesava Rao

- 2028–2035 **The formation of $\alpha + \beta$ microstructure in as-fabricated selective laser melting of Ti–6Al–4V**
- 2036–2043 **Laser metal deposition and selective laser melting of Fe–28 at.% Al**
- 2044–2054 **Tribological and corrosion properties of Al–12Si produced by selective laser melting**
- 2055–2065 **Optimized welding parameters for Al 6061 ultrasonic additive manufactured structures**
- 2066–2071 **Effects of wire feed conditions on in situ alloying and additive layer manufacturing of titanium aluminides using gas tungsten arc welding**
- 2072–2079 **Precipitation and austenite reversion behavior of a maraging steel produced by selective laser melting**

CERAMICS

INVITED PAPERS

- 2080–2085 **Materials for high speed sintering**
- 2086–2094 **Shaping of ceramic parts by selective laser melting of powder bed**

ARTICLES

- 2095–2099 **Strategies for the selective volume sintering of ceramics**
- 2100–2107 **Microdrop generation and deposition of ionic liquids**

Marlo Simonelli, Yau Yau Tse,
C. Tuck

Gesa Rolink, Sabrina Vogt,
Lucia Senčekova,
Andreas Weisheit,
Reinhart Poprawe, Martin Palm

K.G. Prashanth, B. Debalina,
Z. Wang, P.F. Gostin, A. Gebert,
M. Calin, U. Kühn, M. Kamaraj,
S. Scudino, J. Eckert

Paul J. Wolcott, Adam Hehr,
Marcelo J. Dapino

Yan Ma, Dominic Cuiuri,
Nicholas Hoye, Huijun Li,
Zengxi Pan

Eric A. Jägle, Pyuck-Pa Choi,
Jan Van Humbeeck, Dierk Raabe

Adam Ellis, Christopher J. Noble,
Liam Hartley, Charis Lestrange,
Neil Hopkinson, Candice Majewski

Enrique Juste, Fabrice Petit,
Véronique Lardot, Francis Cambier

Thomas Mühler, Gundula Helsch,
Jürgen G. Heinrich, Dongxu Yao,
Stephan Gräf, Frank A. Müller,
Jens Günster

Víctor J. Cadarso,
Julia Perera-Nuñez,
Antonio Mendez-Vilas,
Luis Labajos-Broncano,
Maria-Luisa González-Martín,
Jürgen Brugger