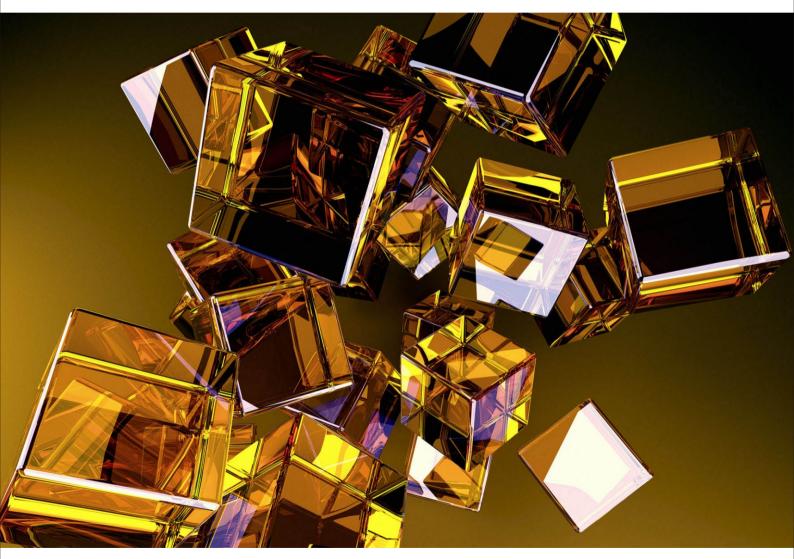
ISSN: 2153-117X



# Materials Sciences and Applications





# **Journal Editorial Board**

https://www.scirp.org/journal/msa

.....

#### **Editorial Board**

Prof. Mutlu Özcan University of Zurich, Switzerland

Prof. Raed Abu-Reziq The Hebrew University of Jerusalem, Israel

Prof. Nacer Badi University of Houston, USA

Prof. Huan-Tsung Chang

National Taiwan University, Chinese Taipei

Dr. Emerson Oliveira da Silva

Federal University of Rio de Janeiro, Brazil

Prof. Walid M. Daoush Helwan University, Egypt

Prof. Nasrallah M. Deraz
National Research Center, Egypt
Prof. Stephen U. Egarievwe
Alabama A&M University, USA
Prof. Manal Kamal Ismail El-bisi
National Research Center, Egypt

Dr. Eman El-Shenawy Central Metallurgical Research and Development Institute

(CMRDI), Egypt

Prof. Khaled M. Ibrahim Permanent Central Metallurgical R&D Institute, Egypt

Prof. Ibrahim Karaman Texas A&M University, USA

Prof. Sergey Krasikov Institute of Metallurgy of Ural Branch of the Russian Academy

of Sciences, Russia

Prof. Athanasios G. Mamalis National Technical University of Athens, Greece

**Dr. Rui Neves** Polytechnic Institute of Setúbal, Portugal

Prof. Chunxu Pan Wuhan University, China

Dr. Alessandro Pegoretti University of Trento, Italy

**Dr. Leinig Antonio Perazolli** Universidade Estadual Paulista, Brazil

Dr. Harekrushna SutarIndira Gandhi Institute of Technology Sarang, IndiaDr. Xiangliang WanWuhan University of Science and Technology, China

Prof. Gayle E. Woloschak Northwestern University, USA

**Prof. Dongfeng Xue** Dalian University of Technology, China

Dr. Raghvendra Singh Yadav Brno University of Technology, Czech Republic

**Prof. Jory A. Yarmoff** University of California, USA

**Dr. Fei Zhang** Michigan State University, USA



ISSN Online: 2153-1188 ISSN Print: 2153-117X

## **Table of Contents**

## Volume 13 Number 4 April 2022 Factors Affecting Thermal Shrinkage of Mouthguard Sheet during Thermoforming: Model Shape and Sheet Material Thickness M. Takahashi, Y. Bando. Measurement of the Energy Absorbed during Nanoscale Deformation of Human Peritubular and Intertubular Dentin J. Yan, B. Taskonak, J. J. Mecholsky Jr......144 Hydrogen Solubility in Liquid and Solid Pure Aluminum—Critical Review of Measurement Methodologies and Reported Values Crystal Sizes and Energy Gaps of Cerium Oxide Using Co-Precipitation Method Fabrication of ZrC/ZrB<sub>2</sub>/C Composites Having High Mechanical **Properties at Elevated Temperatures** Nanocellulose: Effect on Thermal, Structural, Molecular Mobility and Rheological Characteristics of Poly(Butylenes Adipate-Co-Butylene Terephthalate) Nanocomposites G. A. V. Albitres, F. P. A. Junior, D. F. S. Freitas, D. M. Mariano, M. I. B. Tavares, L. C. Mendes......249

# Materials Sciences and Applications (MSA) Journal Information

#### SUBSCRIPTIONS

The *Materials Sciences and Applications* (Online at Scientific Research Publishing, <a href="https://www.scirp.org/">https://www.scirp.org/</a>) is published monthly by Scientific Research Publishing, Inc., USA.

#### Subscription rates:

Print: \$89 per issue.

To subscribe, please contact Journals Subscriptions Department, E-mail: <a href="mailto:sub@scirp.org">sub@scirp.org</a>

#### **SERVICES**

#### Advertisements

Advertisement Sales Department, E-mail: service@scirp.org

#### Reprints (minimum quantity 100 copies)

Reprints Co-ordinator, Scientific Research Publishing, Inc., USA.

E-mail: sub@scirp.org

#### **COPYRIGHT**

#### Copyright and reuse rights for the front matter of the journal:

Copyright © 2022 by Scientific Research Publishing Inc.

This work is licensed under the Creative Commons Attribution International License (CC BY).

http://creativecommons.org/licenses/by/4.0/

#### Copyright for individual papers of the journal:

Copyright © 2022 by author(s) and Scientific Research Publishing Inc.

#### Reuse rights for individual papers:

Note: At SCIRP authors can choose between CC BY and CC BY-NC. Please consult each paper for its reuse rights.

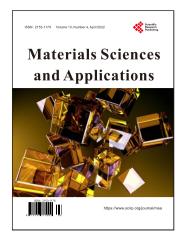
#### Disclaimer of liability

Statements and opinions expressed in the articles and communications are those of the individual contributors and not the statements and opinion of Scientific Research Publishing, Inc. We assume no responsibility or liability for any damage or injury to persons or property arising out of the use of any materials, instructions, methods or ideas contained herein. We expressly disclaim any implied warranties of merchantability or fitness for a particular purpose. If expert assistance is required, the services of a competent professional person should be sought.

#### PRODUCTION INFORMATION

For manuscripts that have been accepted for publication, please contact:

E-mail: msa@scirp.org



# **Call for Papers**

# **Materials Sciences and Applications**

ISSN 2153-117X (Print) ISSN 2153-1188 (Online) https://www.scirp.org/journal/msa

Materials Sciences and Applications (MSA) is an international refereed journal dedicated to the latest advancement of materials. The goal of this journal is to keep a record of the state-of-the-art research and promote the research work in these fast moving areas.

#### Editorial Board

Prof. Mutlu Özcan

Prof. Raed Abu-Reziq

Prof. Nacer Badi

Prof. Huan-Tsung Chang

Dr. Emerson Oliveira da Silva

Prof. Walid M. Daoush

Prof. Nasrallah M. Deraz

Prof. Stephen U. Egarievwe

Prof. Manal Kamal Ismail El-bisi

Dr. Eman El-Shenawy
Prof. Khaled M. Ibrahim

Prof. Ibrahim Karaman

Prof. Sergey Krasikov

Prof. Athanasios G. Mamalis

Dr. Rui Neves

Prof. Chunxu Pan

Dr. Alessandro Pegoretti

Dr. Leinig Antonio Perazolli

Dr. Harekrushna Sutar Dr. Xiangliang Wan

Prof. Gayle E. Woloschak

Prof. Dongfeng Xue

Dr. Raghvendra Singh Yadav

Prof. Jory A. Yarmoff

Dr. Fei Zhang

#### Subject Coverage

This journal invites original research and review papers that address the following issues in materials sciences and applications. Topics of interest include, but are not limited to:

- Biological, Biomechanical and Biomedical Materials
- Composite Materials
- Electrical and Electronics Materials
- Fibers and Matrix Materials
- Functional Materials, including Shape Memory Materials, Self Healing Materials, etc.
- Light Emitting Material
- Magnetic Material
- Materials Chemistry
- Metals and Alloys
- Nanocomposites

- Nanomaterials including Nanostructured and Nanoscale Materials
- Nanosensors
- Nanostructured Materials
- Organic Materials
- Physics, Chemistry, Mechanics and Applications in Materials Science

E-mail: msa@scirp.org

- Rubber/Elastomeric Materials
- Semiconductor Materials
- Textile Materials
- Thin Film and Coatings

We are also interested in: 1) Short Reports—2-5 page papers where an author can either present an idea with theoretical background but has not yet completed the research needed for a complete paper or preliminary data; 2) Book Reviews—Comments and critiques.

### Notes for Intending Authors

Submitted papers should not have been previously published nor be currently under consideration for publication elsewhere. Paper submission will be handled electronically through the website. All papers are refereed through a peer review process. For more details about the submissions, please access the website.

#### Website and E-Mail

https://www.scirp.org/journal/msa