

Reviews on Advanced Materials Science

Volume 4, Number 2, August 2003

**Topical Issue on:
“Nanostructured Materials”**

Guest Editor:

**Vladimir Konakov
Institute of Silicate Chemistry
Russian Academy of Sciences**

and

**Yuri Titovets
St.Petersburg State
Polytechnical University**

Editorial Policy. The journal "Reviews on Advanced Materials Science" provides an international medium for the publication of reviews, topical issues and international conference proceedings in the area of theoretical and experimental study of advanced materials. Focuses are placed on, but not limited to nanostructured materials, semiconductors and high-transition-temperature superconductors. We encourage prospective authors to correspond with the principal editor before submitting a review article. Proposals should include an outline with key citations. All papers submitted will be rigorously peer-reviewed prior to publication. The journal "Reviews on Advanced Materials Science" is published in both paper and electronic versions.

CONTENTS

Preface	A4
Disclinations and Rotational Deformation in Nanocrystalline Materials	79
M.Yu. Gutkin and I.A. Ovid'ko	
Ferroelectric Nanotubes	114
F. D. Morrison, Y. Luo, I. Szafraniak, V. Nagarajan, R. B. Wehrspohn, M. Steinhart, J. H. Wendorff, N. D. Zakharov, E. D. Mishina, K. A. Vorotilov, A.S. Sigov, S. Nakabayashi, M. Alexe, R. Ramesh, and J. F. Scott	
Modification of Implanted Metal Nanoparticles in the Dielectrics by High-Power Laser Pulses	123
A.L. Stepanov	
Preparation, Structure and Mechanical Properties of Nanostructured Copper-Carbon Films	139
Y. Pauleau, F. Thiéry, V.V. Uglov, A.K. Kuleshov, S.N. Dub and M.P. Samtsov	
Nanostructured Mesoporous Silica Films	147
M. C. Gonçalves and G. S. Attard	
Nanocrystalline Structure Formation under Severe Plastic Deformation and Its Influence on Mechanical Properties	155
S. Firstov, M. Brodnikovsky, M. Danylenko and Yu. Podrezov	
Defects in Square 2D Arrays of Strained Quantum Dots	163
I.A. Ovid'ko and A.G. Sheinerman	
Copyright Transfer Form	A5
“Reviews on Advanced Materials Science” – Subscription Order Form	A6

PREFACE

Nanostructured materials represent the subject of rapidly growing multidisciplinary research efforts motivated by a wide range of structural and functional applications of these materials exhibiting unique physical, mechanical, chemical and biological properties. Progress in applications for nanostructured materials crucially depends on the development of new fabrication and processing technologies, along with a fundamental understanding of the relationship between the structure and properties.

This special issue contains selected papers focused on fundamental and applied studies of nanostructured bulk materials, films, nanotubes and nanocomposites, which will be of interest to researchers and graduate students in the field of nanostructured materials science and nanotechnologies.

Vladimir Konakov
Institute of Silicate Chemistry
Russian Academy of Sciences

and

Yuri Titovets
St.Petersburg State
Polytechnical University

**ADVANCED STUDY CENTER.
TRANSFER OF COPYRIGHT AGREEMENT**

Article entitled:

Corresponding author:

To be published in the journal: "Reviews on Advanced Materials Science"

Effective upon acceptance for publication, copyright (including all rights thereunder and including the right to authorise photocopying and reproduction in all media, whether separately or as a part of a journal issue or otherwise) in the above article and any modifications of it by the author(s) is hereby transferred throughout the world and for the full term and all extensions and renewals, to:

"Advanced Study Center" Co. Ltd., (St. Petersburg, Russia)

This transfer includes the right to adapt the presentation of the article for use in conjunction with computer systems and programs, including reproduction or publication in machine-readable form and incorporation in retrieval systems.

Rights of authors

The following rights are retained by the author(s):

1. Patent and trademark rights and rights to any process or procedure described in the article.
2. The right to photocopy or make single electronic copies of the article for their own personal use, including for their own classform use, or for the personal use of colleagues, provided the copies are not offered for sale and are not distributed in a systematic way outside of their employing institution (e.g. via an e-mail list or public file server). Posting of a preprint version of this work on an electronic public server is permitted. Posting of the published article on a secure network (not accessible to the public) within the author's institution is permitted. However, posting of the published article on an electronic public server can only be done with written permission of Advanced Study Center. Co. Ltd.
3. The right, subsequent to publication, to use the article or any part thereof free of charge in a printed compilation of works of their own, such as collected writings or lecture notes, in a thesis, or to expand the article into book-length form for publication.

Note

All copies, paper or electronic, or other use of the information must include an indication of the copyright ownership and a full citation of the journal source. *Please refer requests for all uses not included above, including the authorization of third parties to reproduce or otherwise use all or part of the article (including figures and tables) to:*

Reviews on Advanced Materials Science

Editorial Office

Institute of Problems of Mechanical Engineering Russian Academy of Sciences

Bolshoj 61, Vas.Ostrov, St.Petersburg 199178, Russia

E-mail: rams@def.ipme.ruá Fax: +(7 812)321 4771

Authorship

If the article was prepared jointly with other author(s), the signing author has informed the co-author(s) of the terms of this copyright transfer and is signing on their behalf as their agent and represents that he or she is authorized to do so. Please confirm by marking the appropriate box following the signature line. The signing author shall bear the responsibility for designating the co-author(s) and must inform Advanced Study Center of any changes in authorship.

If copyright is held by the employer, the employer or an authorized representative of the employer must sign. If the author signs, it is understood that this is with the authorization of the employer and the employer's acceptance of the terms of the transfer. Please confirm by marking the appropriate box following the signature line.

Warranties

The author(s) warrant(s) that the article is the author's original work and has not been published before. The author(s) warrant(s) that the article contains no libelous or other unlawful statements, and does not infringe on

the rights of others. If experts from copyrighted works are included, the author(s) has (have) obtained or will obtain written permission from the copyright owners and will credit the sources in the article.

Signature of copyright owner(s) *:

Name (printed):

Title (if employer representative):

Company or institution:

Date:

If any of the following apply, please mark the box(es):

author on behalf of all co-authors

employer representative

PLEASE SIGN IN INK AND RETURN THE COMPLETE **ORIGINAL** (do not send by fax), retaining a copy of this form for your files, TO:

Reviews on Advanced Materials Science

Editorial Office

Institute of Problems of Mechanical Engineering Russian Academy of Sciences

Bolshoj 61, Vas.Ostrov, St.Petersburg 199178, Russia

E-mail: rams@def.ipme.ru, Fax: +(7 812)321 4771

*To be signed by the author, also on behalf of any co-authors, or to be signed by employer, where appropriate.

Journal REVIEWS ON ADVANCED MATERIALS SCIENCE

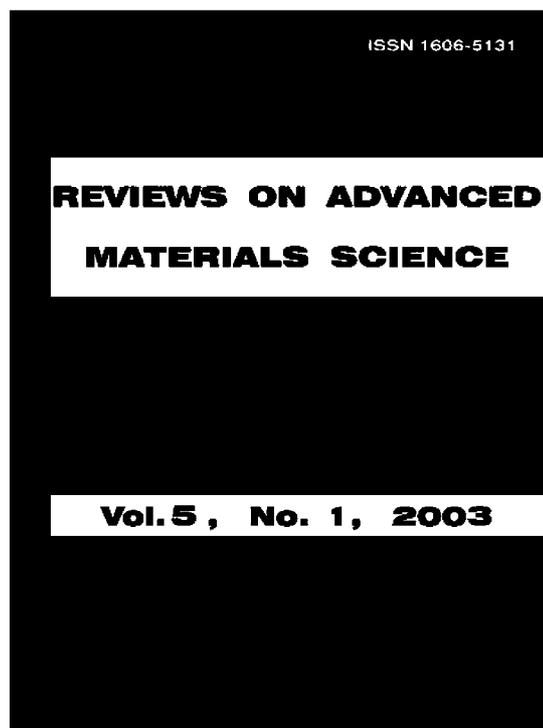
*ADVANCED MATERIALS AND NANOSTRUCTURES
FROM A NEW ANGLE!*

The journal «**Reviews on Advanced Materials Science**» (Principal Editor: I.A.Ovid'ko) provides an international medium for the publication of review articles, conference proceedings and topical issues in the area of theoretical and experimental studies of advanced materials. Particular attention is paid to fundamental and applied research of advanced nanostructured materials.

2003, four or more Issues
ISSN Print 1606-5131

Institutional Rate
for Print Version: US\$ 390.00
(plus Free Online Version)

Personal Rate
for Print Version: US\$ 169.00
(plus Free Online Version)



For subscription order and details, see back page

Principal Editor: I.A. Ovid'ko (*Russia*)

International Editorial Board: M.-I. Baraton (*France*), G.-M. Chow (*Singapore*), Y.G. Gogotsi (*USA*), P. Jena (*USA*), L. Kabacoff (*USA*), E.J. Lavernia (*USA*), C.S. Pande (*USA*), H.-E. Schaefer (*Germany*), S. Seal (*USA*), R.D. Shull (*USA*), B.I. Smirnov (*Russia*), M. Soto (*USA*), S.K. Sundaram (*USA*), R.A. Suris (*Russia*), A. Tholen (*Sweden*), Y.F. Titovets (*Russia*), T. Tsakalakos (*USA*), D. Wolf (*USA*)

Titles of some review papers published in *Reviews on Advanced Materials Science*:

“Scanning Transmission Electron Microscopy: an Experimental Tool for Atomic Scale Interface Science” (by *N.D. Browning et al*); «Diffusion and Related Phenomena in Bulk Nanostructured Materials» (by *M.D. Baro et al*); “Theoretical Models of Plastic Deformation Processes in Nanocrystalline Materials” (by *M. Yu. Gutkin et al*); «Disclinations in Large-Strain Plastic Deformation and Work-Hardening» (by *M. Seefeldt*)

The journal «**Reviews on Advanced Materials Science**» in the electronic form may be found on the websites: <http://www.ipme.nw.ru/e-journals/RAMS/> and <http://www.ipme.ru/e-journals/RAMS/>

Journal **Reviews on Advanced Materials Science**

SUBSCRIPTION ORDER FORM

Please enter my subscription for the year 2003 (4 or more issues per year) to the journal "Reviews on Advanced Materials Science" (ISSN 1606-5131). Subscription Rates for 2003 Print Edition (plus Free Access to Electronic Version):

Personal: US\$ 169.00 Institutional: US\$ 390.00

METHOD OF PAYMENT (*Check or Money Order Payable to Nanoscience Journals Distribution LLC*) *Payments in US funds only!*
Charge customers please make sure your name is clearly printed below.

Check / Money Order enclosed Charge my credit card: Visa Master Card

Credit Card No.																				
-----------------	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Expiration Date (mm/yy) ____/____ Signature _____

Name on card _____

Company _____

Street / Address _____

City _____ State/Province _____ Zip _____ Country _____

Phone _____ Fax _____ Email _____

Shipping address if different from the address above:

Company _____

Street / Address _____

City _____ State/Province _____ Zip _____ Country _____

*Please recommend your library to subscribe to the journal by contacting publisher or through an agent **

For Airmail Delivery outside North America add US\$ 25. NOTE: By signing this form, private subscribers confirm that the subscription is for their personal use and it will not be made available to any institute library.

SEND ORDER TO: NANOSCIENCE JOURNALS DISTRIBUTION LLC

3935 Blackstone Ave, Suite 12K, Bronx, NY 10471, USA

Phone/Fax: + (718) 305 8834, e-mail: nanojournal@yahoo.com Home journal page at sites:

<http://www.ipme.nw.ru/e-journals/RAMS/> and <http://www.ipme.ru/e-journals/RAMS/>

Check if you want to receive emails about our new products

LIBRARY RECOMMENDATION CARD

Please use this card to recommend a subscription to the journal to your institute library

Reviews on Advanced Materials Science

ISSN 1606-5131

I need this journal for my research work and it is an important reference for my colleagues/students..

I am a member of the Editorial Board of this journal and I will publish my research work in it.

I recommend that our library subscribe to this journal. The subscription price for 2003 (4 or more issues) is US\$ 390.00 including shipping and handling. For details about the journal please check our websites:

<http://www.ipme.nw.ru/e-journals/RAMS/> and <http://www.ipme.ru/e-journals/RAMS/>

TO: The Librarian at _____

FROM: (Name) Title: _____ Department/Faculty: _____

Signature: _____ Date: _____ Phone: _____

ORDER FROM: NANOSCIENCE JOURNALS DISTRIBUTION LLC

Phone/Fax: + (718) 305 8834 e-mail: nanojournal@yahoo.com

INSTRUCTIONS FOR AUTHORS

Submission of papers:

Manuscript should be submitted in English in both electronic (by e-mail) and hard copy (original +copy) versions.

Hard copy submission:

Manuscripts should be submitted typed on good quality bond paper of A4 format with 1" margins (right, left, top, bottom), double-spaced, using Times Roman 12 pt font, to:

Reviews on Advanced Materials Science
Editorial Office
Institute of Problems of Mechanical Engineering
Russian Academy of Sciences
Bolshoj 61, Vas.Ostrov, St.Petersburg, 199178, Russia
Fax: +(7 812)321 4771

Electronic submission:

Manuscripts should be submitted by e-mail to:

E-mail: rams@def.ipme.ru

Filetypes: TeX (LaTeX) and MS Word files preferred. LaTeX style files are available on the Web-site: <http://www.ipme.nw.ru/e-journals/RAMS/>. Pictures and photos should be submitted in TIFF format (400 dpi).

Length:

Papers should be limited to 200 typewritten pages (including Tables and Figures each on separate page).

Structure of the manuscript:

Cover sheet; Text; Tables; References; Figure Captions; Pictures and Photos

A cover sheet should be included that contains the complete title, the names, affiliations, mailing addresses of the authors, fax and e-mail address of the corresponding author and the abstract.

TITLE – bold, centered. (14 pt)

Author(s) – bold, centered, e.g. **S. R. Brown and T. Klein**

Affiliation(s) – centered, complete postal address for all authors, e-mail address of corresponding author.

ABSTRACT. About 150-200 words.

Tables: type each table on the separate page, number consecutively in arabic numerals and supply a heading.

References:

References should be indicated in the text by consecutive numbers in square parentheses, e.g. [1,2,5-7], as a part of the text, the full reference being cited at the end of the text. References should contain the names of the authors together with their initials, the title of the journal, volume number, year and the first page number as illustrated below. References to books should contain the names of the authors, the title (the names of editors), the publisher name, location and year, as illustrated below.

REFERENCES

[1] R. Birringer, H. Gleiter, H.P. Klein and P. Marquardt // *Phys. Lett.* **102** (1984) 365.

[2] F.R. Nabarro, *Theory of Crystal Dislocations* (Clarendon Press, Oxford, 1967).

[3] V. Provenzano, In: *Nanostructured Materials: Science and Technology*, ed. by G.-M. Chow and N.I. Noskova (Kluwer, Dordrecht, 1998), p. 335.

Figures:

For best results submit illustrations in the actual size at which they should be published. The line drawings of the original should be laser printed, the photographs should be original, with somewhat more contrast than is required in the printed version. Each figure should be typed on separate page, the listing of the figure captions must be included.

Equations must be clearly printed and numbered sequentially with arabic numbers enclosed with round parentheses at the right-hand margin.

Units – the authors are encouraged to use the SI-units, other units are also acceptable.

Макет подготовлен Издательством “Янус”.



Лицензия ЛП № 000349 от 23.12.1999

Отпечатано в типографии ООО “Трэйд”.

Гарнитура Таймс, подписано к печати 09.08.2003, усл. печ. л. 4.5, тираж 400 экз., заказ № 38

REVIEWS ON ADVANCED MATERIALS SCIENCE

PRINCIPAL EDITOR

I. A. Ovid'ko

*Institute of Problems of Mechanical Engineering
(Russian Academy of Sciences (RAS))*

EDITORIAL STAFF

I. Yu. Archakov, *Staff Editor*

A. B. Reizis, *Production Editor*

INTERNATIONAL EDITORIAL BOARD:

M.-I. Baraton

*CNRS, Limoge,
France*

G.-M. Chow

*National University of Singapore,
Singapore*

Y.G. Gogotsi

*Drexel University,
USA*

P. Jena

*Virginia Commonwealth University,
USA*

L. Kabacoff

*Office of Naval Research,
USA*

E.J. Lavernia

*University of California, Irvine
USA*

C.S. Pande

*Naval Research Laboratory,
USA*

H.-E. Schaefer

*Stuttgart University,
Germany*

S. Seal

*University of Central Florida,
USA*

R.D. Shull

*National Institute of Standards
and Technology, USA*

B.I. Smirnov

*Ioffe Physico-Technical Institute
(RAS), Russia*

M. Soto

*Office of Naval Research,
USA*

S.K. Sundaram

*Pacific Northwest National Laboratory
USA*

R.A. Suris

*Ioffe Physico-Technical Institute
(RAS), Russia*

A. Thölén

*Chalmers University of
Technology, Sweden*

Y.F. Titovets

*St.Petersburg State Technical
University, Russia*

T. Tsakalakos

*Rutgers University,
USA*

D. Wolf

*Argonne National Laboratory,
USA*

Editorial Office:

Reviews on Advanced Materials Science

Editorial Office

Institute of Problems of Mechanical Engineering (Russian Academy of Sciences),
Bolshoj 61, Vas. Ostrov, St. Petersburg 199178, Russia
FAX +7(812)3214771

E-mail: rams@def.ipme.ru

Web-sites: <http://www.ipme.nw.ru/e-journals/RAMS/>

<http://www.ipme.ru/e-journals/RAMS/>

Reviews on Advanced Materials Science (ISSN 1606-5131) – Published by Advanced Study Center Co. Ltd. (St.Petersburg, Russia)

Editorial Policy. The journal “Reviews on Advanced Materials Science” provides an international medium for the publication of reviews, topical issues and international conference proceedings in the area of theoretical and experimental study of advanced materials. Focuses are placed on, but not limited to nanostructured materials, semiconductors and high-transition-temperature superconductors. We encourage prospective authors to correspond with the principal editor before submitting a review article. Proposals should include an outline with key citations. All papers submitted will be rigorously peer-reviewed prior to publication. The journal “Reviews on Advanced Materials Science” is published in both paper and electronic versions.

Owner organization: Advanced Study Center Co. Ltd. (St.Petersburg, Russia)

The scientific journal *Reviews on Advanced Materials Science* is included in the Scopus database. Based on 2020, SJR is 0.469. Publisher country is Russia. The main subject areas of published articles are Materials Science(all), Condensed Matter Physics. We offer making basic requirements to academic papers compliance test using "Paper quality checking" service. Paper quality checking service is in demand among researchers who wish to make final improvements to their work before submitting it to the target journal. The experienced editors of ORES, who have published papers in cited journals, with the participation of foreign partners go through finished articles. JournalSeek entry for *Reviews on Advanced Materials Science (Rev Adv Mater Sci)*. Focuses are placed on, but not limited to nanostructured materials, semiconductors and high-transition-temperature superconductors. We encourage prospective authors to correspond with the principal editor before submitting an article. Proposals should include an outline with key citations. All papers submitted will be rigorously peer-reviewed prior to publication. Further information. *Reviews on Advanced Materials Science* website. *Reviews on Advanced Materials Science* is a fully peer-reviewed, open access, electronic journal that publishes significant, original and relevant works in the area of theoretical and experimental studies of advanced materials. The journal provides the readers with free, instant, and permanent access to all content worldwide; and the authors with extensive promotion of published articles, long-time preservation, language-correction services, no space constraints and immediate publication. *Reviews on Advanced Materials Science* is listed inter alia by Clarivate Analytics (formerly Thomson Reuters) - Current Contents/Physical, Chemical, and Earth Sciences (CC/PC&ES), JCR and SCIE. Q3. Materials Science (miscellaneous). 2004. Q2. Search for: Tag: *Reviews on Advanced Materials Science*. December 21, 2018. Newly Launched Open Access Journals Seek to Address Global Environmental Problems Through Fundamental Research. On November 20, 2018, John Irvine, who specializes in materials and energy science the University of St Andrews, Scotland, UK, gave an interview on the occasion of his recent launch of the Gold Open Access, peer-reviewed *Journal of Physics: Energy* in the capacity of its editor-in-chief. Among the rationales for founding this [â€] See reviews and reviewers from *Reviews on Advanced Materials Science*. Publons users have indicated that they sit on *Reviews on Advanced Materials Science*'s editorial board but we are unable to verify these claims. If you are an administrator for *Reviews on Advanced Materials Science*, please get in touch to find out how you can verify the contributions of your editorial board members and more. Top reviewers on Publons (Manuscripts reviewed in last 12 months).