

## EDITORIAL

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### Quarterly Reviews in the Journal ‘Uspehi Fiziki Metallov’

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## USPEHI FIZIKI METALLOV / PROGRESS IN PHYSICS OF METALS WHAT IS IT? WHO READS IT? HOW OFTEN?

The research journal USPEHI FIZIKI METALLOV (UFM) is published since 2000 by the Institute for Metal Physics (IMPh) of the National Academy of Sciences of the Ukraine (NASU), a leading European institution in the physics of metals, metallic compounds and alloys. This edition publishes topical results of fundamental research and applications of metallic solids and liquids.

It is a comprehensive source of important information for all scientists and engineers working in metal physics and physical metallurgy. Each volume includes 4 quarterly issues, which will be abstracted and/or indexed in: ‘Dzherelo’—NASU, Ukraine; ISI® (Research Alert®, SciSearch® Database, Materials Science Citation Index™, The Genuine Article™), USA; CAS® (Chemical Abstracts), USA; VINITI—RAS, Russia; PASCAL—INIST/CNRS, France.

The journal includes the following categories of contributions within the subject area: full-length subject review articles (c. 64 000 words) of research work which are assessed by one or more independent referees, and when necessary by an adjudicator; and from time to time interesting information items pertinent to the metal physics field. Editorial Board members propose that, in addition to regular review papers, invited review articles (c. 64 000 words) submitted by world known scientists on various topics of physical metallurgy and technological applica-

tions should be published. These review papers would enhance the quality and international profile of the journal. It would also provide an excellent opportunity to build bridges for future co-operation which are essential for the survival of a harmonious scientific community. Sponsorship by means of the journal may be one way to progress this internationalization.

## **AIMS AND OBJECTIVES**

The present-day Editorial Board of UFM works to present and integrate the journal into the international forum. To meet this objective we have substantially extended the scope of the journal, so that it covers the achievements in the multidisciplinary field of development and application of advanced technologies and materials, based on fundamental principles of the physics of metals and metallic compounds.

From the end of 2000, the Editorial Board reformed and expanded its team (and proposes to expand it further) with the appointment of new appropriate specialists and foreign Regional Editors to the Editorial Advisory Board who may acquire and commission manuscripts, arrange and initiate the review procedure and approve the manuscript for publication. Alternatively, members of the Editorial Advisory Board may send manuscripts to other members of the editorial team, recommending particular referees. In line with this, even the Ukrainian edition of the journal includes the papers written/submitted in English, as well as in Russian or Ukrainian.

To maintain the quality of our journal, we are constantly updating and expanding our list of referees with known scientific expertise whose views and backgrounds reflect the diversity of interests covered by the UFM. (If scientists are willing to referee articles occasionally, they can submit their contact details and areas of expertise by electronic mail to the e-mail addresses shown at the end of this editorial. This will ensure that any articles sent them for review will be closely related to the appropriate subject area.)

In order to improve the scientific level of our journal and update the aims and scope, the Editorial Board proposes to implement a stricter procedure for the selection of submitted papers according to the highest professional standards stated below.

The scientific guidelines of the journal will be defined by current developments in physical sciences of metals, metallic compounds and alloys, combined with practical demands. Such a strategy is based on the fact that materials science and metal-intensive industry embody advances in physics pertaining to the metallic nature of the above materials.

In this way, the journal publications will aim to discover and publish fundamentally new methods and techniques for producing extraordinary metallic materials with considerably improved physical properties, mate-

rials capable of functioning in extreme conditions and meeting the steadily growing requirements of progress in science and technology. These papers should present problems concerning the development of fundamentally new processes and equipment for modern engineering and technology of an entirely new type, on the basis of materials design. Information about possible ways of drastically reorganizing current manufacturing practice to develop energy- and material-saving technologies is desirable.

## CONTENTS OF THE JOURNAL

With reference to the general requirements of production engineering and know-how, the Editorial Board regards the following types of review papers dealing with experimental, theoretical, computational and applied aspects of investigations as the most important and up-to-date:

(i) papers reporting on studies of structural, physical and electronic properties on the atomic and electronic-states' levels, including electronic band structure and Fermi surfaces, X-ray spectra and optical properties, electronic conduction and superconductivity. This includes properties of crystalline, amorphous and liquid metals, alloys and metallic thin films. Also, papers on lattice-dynamic, thermal, non-electronic transport and magnetic properties specific to metallic systems, polymorphic and disorder–order-type phase transitions, surface properties where the metallic nature of the substrate is important, mechanical properties (plasticity, strength, fracture, *etc.*), behaviour of point defects, defect clusters, dislocations, grain and twin boundaries, precipitates, interfaces, stacking faults and other extended defects, and their study by high-resolution electron microscopy and neutron and X-ray diffraction including synchrotron-source X-ray scattering, *etc.* Fundamental and applied investigations of the structural changes and phase transformations of metals and alloys under extreme conditions (such as high or low temperatures, high pressure or vacuum) as well as in particular states (*e.g.* ultra-thin films, surface and interfacial layers, multilayered structures, monocrystals, quasicrystals, nanocrystalline and microcrystalline materials) under the influence of various external factors (such as radiation, ultrasonic waves, impact stresses, cyclic mechanical and thermal effects, corrosive conditions, rapid heating) are of special interest;

(ii) papers on studies of the relations of structural changes and phase transformations with observable physical properties, interaction between different-type radiations and metals or metallic compounds. Such investigations should include the further development of new technological treatments and investigation techniques for metals and alloys in the particular conditions and states;

(iii) papers dealing with the less-idealized models and concepts

which take into consideration various types of defects and their interactions, non-linear phenomena and synergetics, switching to theoretical and experimental investigations that clearly recognize the mutual influence of atomic, crystal-lattice and electronic structures;

(iv) papers presenting theoretical and experimental research that takes cognizance of the interaction of different types of quasiparticles in metals and alloys, the development of concepts and formulation of a general theory of the condensed matter state (applicable not only to crystalline solids but also to liquids and amorphous materials);

(v) papers which combine theoretical and experimental studies in the interdisciplinary physics of metals and related areas of science and technology (materials research, nuclear physics, biophysics, and biomedical engineering), assuring their mutual co-operation and enrichment;

(vi) papers which provide more extensive use and applications of methods of computer simulation of physical processes in metals and alloys.

In the immediate future the Editorial Board will publish papers which detail the following subjects (besides purely fundamental ones):

(a) research of Fe-, Ni-, Cr-, Mo-, Ti-, Zr-, Hf-, Be-, Mg-, Al-, Y-, and Sc-based materials;

(b) design of alloys for the aviation and space industries, which provide stable and reliable operation in extreme conditions;

(c) development of high-nitrogen and hydrogen steels and alloys;

(d) design and production of weldable steels and alloys with controllable properties;

(e) development of new cast structural alloys, cast and pressed metallic materials which combine strength with special properties, e.g., highly wear-resistant chilled cast iron;

(f) development of materials with the special properties associated with phenomena of thermoelastic phase equilibrium;

(g) development of special methods for diagnostics of crystals with premodified controllable structure and properties including X-ray scattering.

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## COMPUSCRIPTS

Electronic text submissions are welcomed, and we will continue to request that authors submit the final version of their paper on disk. Submitting papers on disk has clear advantages for the speed of publication and this is an attractive option for the authors. Electronic author submissions may also be available; they can be sent by e-mail to [ufm@imp.kiev.ua](mailto:ufm@imp.kiev.ua), [tatar@imp.kiev.ua](mailto:tatar@imp.kiev.ua).

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For a sample issue, which includes a complete list of members of the Editorial Board, to receive an additional information dedicated to UFM, and for ordering, please contact the Editorial Office by e-mail ([ufm@imp.kiev.ua](mailto:ufm@imp.kiev.ua), [tatar@imp.kiev.ua](mailto:tatar@imp.kiev.ua)) and then view the Publisher's web home page site at <http://ufm.imp.kiev.ua>. Full text on-line access and electronic author submissions may also be available. It is still too early to draw any conclusions from such usages. (It is expected that fully electronic version of UFM will be available within the corresponding programmes of the IMPh Publishing respectively.)

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