Hindawi Publishing Corporation
Journal of Nanomaterials
Volume 2013, Article ID 594060, 1 page
http://dx.doi.org/10.1155/2013/594060

Editorial

Nanostructured Bioceramics

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Received 22 September 2013; Accepted 22 September 2013

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With an increase in the world's population, there are enormous demands annually for various biomedical implants to repair diseased or lost tissues. Conventional tissue replacement materials such as autografts and allografts are associated with several problems, which have triggered the development of novel bioceramic materials during the past three decades. However, it is clear that bioceramics used in a wide range of medical applications still require further improvement. Conventional bioceramics traditionally have maintained a physical function without eliciting specific host tissue responses, whereas modern bioceramics are designed to provide a positive interaction with the host tissue. In that respect, nanobioceramics have become particularly appealing to improve the functionality of conventional microstructured bioceramics in terms of bioactivity and mechanical properties.

This special issue is dedicated to the recent advances in the field of nanobioceramics. The issue includes a contribution by U. Boonyang et al., on the fabrication of bioactive glass particles with controllable structure and porosity via a dual-templating technique. Another research article by Y. Nakagawa and his group investigated the biological effects of β-tricalcium phosphate particles on the proliferation, toxicity, and calcification of mesenchymal stem cells. A. J. Nathanael et al. at Yeungnam University, Korea, synthesised and studied flower-like hydroxyapatite nanostructures via a polymer-assisted hydrothermal technique. H. Maeda's group at Nagoya Institute of Technology, Japan, fabricated and studied CaO-SiO_2 glass-ceramic spheres with nanosized pores via an electrospray technique. D.-H. Kim et al. demonstrated the potential of using porous spherical magnesium-substituted biphasic calcium phosphate scaffolds as stem cell microcarriers. J. Liu and his group from Kyushu Institute of Technology, Japan, studied the bioactivity and mechanical properties of glass ionomer cement prepared from Al_2O_3-SiO_2 glass and poly(γ-glutamic acid). A research article by J.-C. Chen et al. from Kaohsiung Medical University, Taiwan, studied the biological properties of pearl nanocrystallites. Finally, T. Konishi et al. developed and studied a biodegradable α-tricalcium phosphate cement based on chelating capability of inositol phosphate.

Acknowledgments

The editors would like to thank all authors for their contributions to this special issue. In addition, we would like to acknowledge all reviewers for their valuable contributions and dedicated services in the peer review process of the manuscripts submitted to this issue.

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Jie Huang
Mamoru Aizawa
Sander Leeuwenburgh

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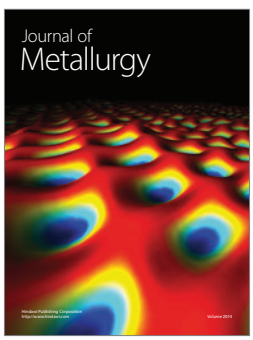
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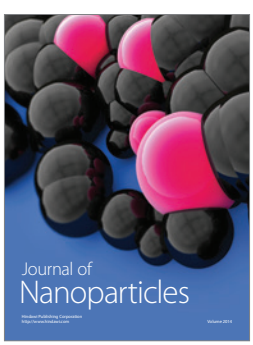
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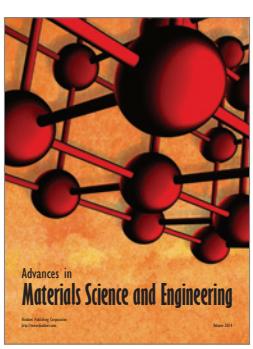
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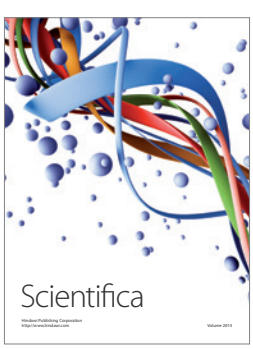
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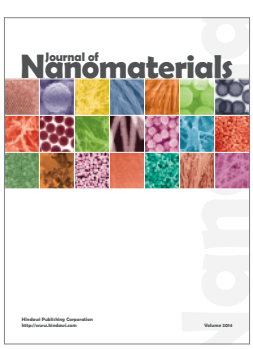
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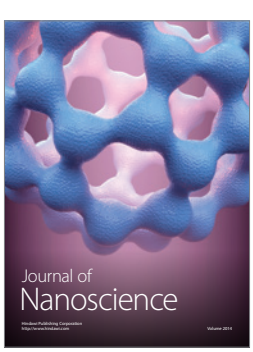
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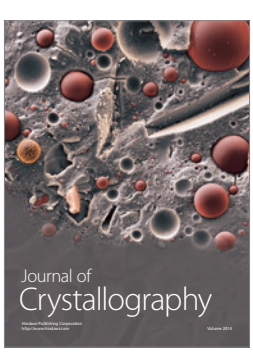
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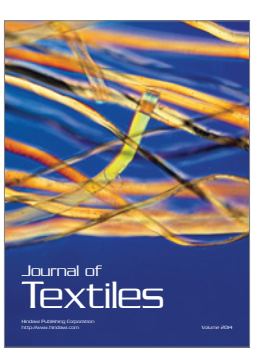
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