PREFACE

This special issue is one of the outcomes of ongoing national research project as Scientific Research on Innovative Area of the Grant-in-Aid from the Ministry of Education, Culture, Sports, Science and Technology, Japan, which started 2010. This special issue collects 18 recent research papers not only from the results in the projects but also from the related areas on bulk nanostructured metals.

Bulk nanostructured metals are usually such bulk-scale metals that have the average grain size smaller than 1 µm. Severe plastic deformation or electrodeposition processes are well known methods to produce those bulk nanostructured metals. It has been elucidated that bulk nanostructured metals exhibit both high strength and toughness, which have been considered mutually exclusive. Such outstanding properties of bulk nanostructured metals have not been fully understood so far based on the knowledge stored in materials with a conventional grain size. Bulk nanostructured metals contain a large number of grain boundaries and other lattice defects such as dislocations and point defects. Therefore, it is essential to build a new category of study taking into account the interaction between grain boundaries and lattice defects in the nanoscopic point of view.

In the previous special issue of Materials Transactions on bulk nanostructured metals in 2011 (No. 1, Vol. 53), 24 papers were included, which demonstrated the energetic activities in this area of academia. Two years are long enough to elucidate the new properties and the mechanism behind them since the studies in this field have been advanced day by day. New knowledge is being stored integrating experimental science and multi-scale computer science such as first-principle calculation, molecular dynamics and finite element methods. Therefore, we decided to edit a special issue again in this research area, aiming to collect cutting edge studies on bulk nanostructured metals all over the world, including experimental, theoretical and computational simulation studies. The following topics are focused on in particular:

1. Novel Processing for Making Bulk Nanostructured Metals
2. Structures in Bulk Nanostructured Metals
3. Computational Bulk Nanostructured Metals
4. Mechanical and Functional Properties of Bulk Nanostructured Metals

It is our great pleasure when this special issue will play a significant role on advancing materials science through the studies on bulk nanostructured metals.

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