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The 7th International Conference on Nanomaterials by Severe Plastic Deformation – Preface

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Severe plastic deformation (SPD) has arguably been the most effective top-down approach to producing bulk nanostructured materials from more conventional, coarse-grained ones. During SPD processing, a giant shear deformation of a material is combined with very high hydrostatic pressure to produce ultrafine (< 1 μm) or nanocrystalline (< 100 nm) grain structure. Despite the huge strain involved, popular SPD techniques practically do not change the dimensions of a work-piece, which makes them very attractive for future industry-scale applications. By appropriately choosing SPD processing parameters that give rise to desirable microstructure, one can produce materials with exceptional mechanical properties and in many cases unusual functional characteristics.

A series of international events briefly referred to as NanoSPD conferences have become major forums for the growing community of researchers exploring the potential of severe plastic deformation as a means of producing bulk ultrafine-grained or nanostructured materials. The 7th International Conference on Nanomaterials by Severe Plastic Deformation in Sydney (2-7 July 2017) is the seventh in this series of conferences held on a triennial basis. It follows the conferences that took place in Moscow (1999), Vienna (2002), Fukuoka (2005), Goslar (2008), Nanjing (2011), and Metz (2014). NanoSPD conferences have provided an important platform for discussion of a wealth of challenging scientific problems and new technological developments in the NanoSPD area. These Proceedings contain a selection of peer-reviewed papers presented at NanoSPD7 that cover the major themes of the conference. These include SPD processing techniques as well as microstructures, deformation mechanisms and properties of SPD-processed materials. Naturally, mechanical properties figure in the Proceedings most prominently, but functional properties, including biodegradation and biocompatibility, are represented as well. A number of articles are dedicated to modelling of SPD processes and the mechanical behaviour of bulk nanostructured materials. A historical perspective and a survey of the most important developments in the field since the NanoSPD6 conference in Metz as well as the emerging industry-scale applications of SPD-modified materials are given in an introductory article by R.Z. Valiev and T.G. Langdon.



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