Editorial

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Biographical notes: Janez Grum is a Professor of Materials Science at the Faculty of Mechanical Engineering, University of Ljubljana, Slovenia. He is also the Founder and Editor-in-Chief of a new journal, the *International Journal of Microstructure and Materials Properties (IJMMP)*. He is the Editor of six NDT conference proceedings, five ASM, Marcel Dekker and Taylor & Francis book chapters and five books with several reprints. He has also published more than 200 refereed journal papers on heat treatment and surface engineering, laser materials processing and materials testing, including non-destructive testing.

The present issue of *International Journal of Microstructure and Materials Properties* comprises seven spontaneous papers discussing mechanical and microstructure properties of various materials.

The following papers have been included in this issue:

Hu presented strains prediction of plastic deformation process for magnesium alloy fabrication, a plastic deformation method that includes initial forward extrusion and bidirectional lateral extrusion process subsequently. The strain and stress predictions and influences of the plastic deformation on the grain refinement of the microstructure and effective strain and stress have been researched. Microstructure observations have been carried out in different positions of formed rods.

Goel et al. presented experimental evaluation of mechanical properties and fracture–fatigue simulation at cryo- and room-temperature-rolled zircaloy-2. The effect of rolling on the fracture properties has been evaluated by performing two-dimensional quasi-static crack growth simulations using finite element approach under plane stress condition. *J*-integral and internal energy of the mercury quenched, CR and RTR zircalloy-2 are evaluated and compared with each other. The S-N curves are obtained through finite element simulations. After performing the fracture and fatigue simulations, it is found that 85% cryorolled zircaloy-2 possesses better fracture and fatigue behaviour when compared with mercury quenched and 85% RTR zircaloy-2.

Wang et al. studied continuous cooling transformation and strength-toughness of X70 pipeline steel with high deformability. The study showed that the phase transformation of X70 pipeline with high deformability mainly occurred in the range of 500–800ºC with Ac1 = 730ºC and Ac3 = 890ºC. Furthermore, as the cooling rate increased, the phase transformation temperature decreased and the hardness of the steel increased. The stress–strain curve of X70 pipeline steel with high deformability exhibited round-house type and the steel had excellent strength-toughness and uniform elongation (>10%), low yield ratio (<0.8) and high strain hardening exponent.

Ben Abdelali et al. worked on numerical characterisation of the friction coefficient at the tool-chip-workpiece interface during friction tests. This paper aims at identifying a workpiece surface temperature and an equivalent plastic strain at this interface during the dry cutting of an AISI1045 with TiN-coated carbide tools. A 3D Arbitrary Lagrangian Eulerian numerical model simulating the frictional test has been developed. A large range of sliding velocities (5–300 m/min) has been investigated. It has been shown that plastic strain and workpiece surface temperature are mainly dependent on sliding velocity.

Ahmed and Teng worked on characterisation of fractured particulate-reinforced composite. The objective of this analysis is to predict the effective stiffness of a particulate-reinforced composite through finite element method as a powerful tool. Basically, the investigation covers the assessment of two specific cases. In the first case, a perfect particulate reinforcement is considered, where the particles are considered as fully intact. In the second case, the particles are proposed to be fully fractured. Linear elastic, two-dimensional FEA is adopted in the analysis. The particle's stiffness is considered as a substantial parameter in the analysis. Moreover, various particle volume fractions are taken into account to discover their influence on the effective Young's modulus for the studied cases.

Wang et al. studied coupling agent modification of cotton stalk bast fibres reinforced polylactic acid flame-retardant composites. In this experiment, cotton stalk bast fibre was modified, respectively, with A-171, KH-550and TC-114 coupling agent, to improve the mechanical properties of fibre board. After testing the modified fibre board of its mechanical properties and analysing coupled fibre with FT-IR, it is proved that there were some new groups introduced into the fibre. Experimental results showed that adding A-171 and KH-550 type of silane coupling agent improves the mechanics properties of the material increasingly.

Pleshivtseva presented robust optimal control of induction heating under interval uncertainty prior a hot forming. Two-dimensional time-optimal control problem is formulated assuming that complete information with respect to the initial temperature and heat losses is not available and that their interval uncertainty can be written in the form of inequalities. Optimal control technique and computational procedure are described in detail. Results of computations are provided as an example of the proposed technique application to the various processes of aluminium alloy billets heating. The total process time loss is compared with optimal process time calculated for precisely determined data.

All papers have been reviewed according to journal procedures and standards. We sincerely thank all authors for their valuable contributions and having observed all reviewers comments and suggestions. My thanks also go to all reviewers for their effort in reviewing papers. Our great thanks are also due to our co-worker Mr. Franc Ravnik, BSc, who took care of the coordination among the reviewers and the authors and prepared the papers for publication.

We sincerely hope that the papers published will be a useful source of information for engineers and researchers at their professional work.