
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 the *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:

Reddy et al. investigated weldability and mechanical properties of dissimilar weldments of AISI 4140 and AISI 316. These dissimilar metals were welded using gas tungsten arc welding (GTAW) and pulsed current GTAW (PCGTAW) employing ER309L filler wire. Tensile test results showed that fracture occurred at the parent metal of AISI 316 in all the trials for both the weldments. SEM/EDS analysis was performed at various zones of the as-welded samples revealed the structure property relationships.

Bilić et al. studied influence of welding conditions on resistance flash welds. They give insight into welding process with emphasis on process dynamics. For experiments ribbed mild steel concrete reinforcement bars were used with a range of welding parameters. The welded bars were tested for tensile strength and results were used to develop a regression model. The model was designed to predict weldpiece strength according to input welding parameters such as welding force, welding current and welding time.

Hu presented effects of extrusion on the grain refinements of magnesium alloy AZ31. He used simulation models built by using the DEFORM software. Temperature and strain evolution for deformation varying with initial billet temperatures was explored. The simulation results and microstructure observation showed that extrusion and subsequent sheering process can introduce compressive and accumulated shear strains into the magnesium alloy and improve the dynamic recrystallisation.

Žagar and Grum analysed surface modification analysis after shot peening of aluminium alloy in different states. The objective of the research was to establish the optimal parameters of the shot peening treatment of the aluminium alloy in different precipitation hardened states with regard to residual stress and fatigue in dynamic

loading. Residual stress was measured using a relaxation hole drawing method in accordance with ASTM standard with high speed drilling and measuring strain. The resulting residual stress profiles reveal that stresses throughout the thin surface layer of all shot peened specimens are of compressive nature. The results of material fatigue testing differ from the level of shot peening on the surface layer.

Merline Shyla et al. investigated the effect of porosity on the transport properties of porous silicon. Microelectronics technology today is dominated exclusively by Silicon (Si). The inefficiency of Si to emit light even at cryogenic temperatures has been overcome with discovery of porous silicon (PS) and its visible luminescence at room temperature. Consequently, PS is being extensively utilised in optoelectronic technology. Investigation was aimed at analysing the effect of increasing dependent dark and photo conductivity and further substantiating the result with modulation techniques. The porosity was found to increase with increasing etching time. The variation in conductivity was compared with the change in porosity, determined through scanning electron microscopy investigation. The conductivity was found to increase as porosity increased and the effect could be attributed to the increase of porosity. Temperature-dependent studies reveal a decrease in activation energy with increase in porosity an increase in conductivity.

Eswar et al. presented ZnO nanostructures on different silicon-based substrate via simple sol-gel immersion method. Porous silicon was prepared by electrochemical etching to modify the silicon surface. Field Emission Scanning Electron Microscopy displayed different distribution and nanostructure of ZnO on different substrate. The seeded showed better conditions for the growth of ZnO nanostructure due to presence of nucleation site. Crystalline of ZnO nanostructure were investigated by X-ray diffraction (XRD) grating. It was found that the hexagonal wurtzite of ZnO nanostructure were produced for all samples.

Bai prepared melted glass with CoO as colorants and studied its optical performance. The blue-green glass is produced from the glass raw material, $\text{Na}_2\text{O}-\text{CaO}-\text{SiO}_2$, as fundamental material with addition of CoO in combination as colorants. The paper presented various factors affecting the glass colouring through the analysis by experiments. Samples of glass plates were obtained through the melting of mixed batch glass material. The analysis of spectrum transmittance was carried out separately by spectrophotometer. The test results indicated that the mentioned factors can affect the glass colouring in different extent.

All papers have been reviewed according to journal procedures and standards. I sincerely thank to all authors for their valuable contributions and having observed all reviewers comments and suggestions.

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