
Editorial

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Biographical notes: C. Hakan Gür is a Professor in the Department of Metallurgical and Materials Engineering at Middle East Technical University, Ankara, Turkey. He is also the Director of the Welding Technology and Nondestructive Testing Research and Application Center at the same university. He has published numerous papers on a wide range of topics in materials engineering, and recently co-edited the *Handbook of Thermal Process Modeling of Steels*. His current research interest includes simulation of welding, nondestructive evaluation of residual stresses and characterisation of microstructures.

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 ten papers discussing investigations conducted on various fields of materials and materials properties.

The following authors contributed their papers with the following topics.

Lübben et al. discussed determination of heat transfer coefficient (HTC) during high-speed water quenching. They presented experimental determination of HTC flow field. The comparison of measurements and simulations showed a systematic discrepancy, which was explained by systematic error at the method due to the complexity of models.

Frerichs and Lübben studied influence of geometrical features on rewetting behavior of cylindrical components. Their paper investigated the influence of geometrical properties on the starting of rewetting and the movement of the rewetting front across the workpiece during quenching with high speed oil. Cylinders of stainless steel with different edge shapes, lengths, and diameters were used.

Fernandes et al. worked on effect of the strain-hardening on the wear and corrosion behaviour of a Fe-32Mn-8Al-C alloy. They evaluated the wear and corrosion resistance of the alloy after cold-rolling with thickness reductions of 20%, 40% and 80%. The wear resistance increased as the reduction level was increased and corrosion resistance decreased with the increase of the strain-hardening. The results are interesting as they developed austenitic Fe-Mn-Al alloys that can substitute, in some applications, traditional stainless steels.

Darsouni and Tualbia presented thermo-viscoplastic behaviour of TA6V titanium alloy. They used a modified Hopkinson bar which is based on direct-impact technique and described thermo-viscoplastic behaviour of titanium alloy using Rusinek-Klepaczko constitutive relation.

Yilmazer et al. investigated effect of high-pressure torsion processing on microstructure and mechanical properties of a biomedical β -type titanium alloy. They investigated the effect of high-pressure torsion (HPT) processing on the microstructure and the mechanical properties. The microstructure of given alloy, which was subjected to processing after cold rolling, exhibited a single β phase composed of nano grains with high-angle boundaries. The grains had non-uniform subgrains with high angle misorientation and high dislocation density.

Alexandrov and Chembarisova analysed dislocation-kinetic approach to the analysis of deformation mechanisms of metals and alloys. The influence of the temperature-strain rate conditions of deformation on the character of dislocation processes, taking place in some pure metals and alloys was investigated. Special attention was given to the effect of grain boundaries, twins, impurity atoms and a non-equilibrium state of the grain boundaries obtained by several plastic deformation methods.

Orosz and Gömze presented effect of ceramic additives on mechanical properties of alumina matrix composites. They used lower purity alumina compacting powders containing low amounts of additional materials SiO_2 , CaO , MgO . They presented mechanical properties using variable ceramic additives. The aim was to enhance the mechanical performance of the lower purity alumina (94%) in composite system and to reach the values of mechanical properties of high purity alumina products.

Pázmán et al. investigated production and investigation of Al/SiC(Ni)_p composites. They researched the silicon carbide particles with three different pre-treatments: acidic pre-treatment, surface oxidation and palladium chloride activation. The surface coating showed an effect on the mechanical properties of composite by new phases. These phases were studied by X-ray diffractometry, X-ray photoelectron spectroscopy and scanning electron microscopy.

Belattar et al. worked on non-destructive testing by infra-red thermography of the void and honeycomb type defect on the concrete. Infra-red thermography principle is based on the analysis of the thermal images captured on a surface of the suspect structure. The results show the influence of the defect nature and position, the heating duration and the moment of the thermal images taking on the detectability of the anomalies present in the structure.

Tahraouri et al. worked on ultrasonic investigation for coated materials: layer/substrate: SiC/Si, Al/SiC. The study was based on the acoustic signal simulation received by the reflection acoustic microscope along the coated material. The simulated signal showed the variation of the reflection coefficient as a function of the angle of incidence of the acoustic wave. He also determined the variations for this coefficient as a function of the transverse and longitudinal attenuation coefficient.

The first eight papers were selected among those presented at 15th International Metallurgy and Materials Congress (IMMC 2010) held in Istanbul in November 2010. The last two papers were selected among spontaneously received papers. All papers were extended and reviewed by distinguished reviewers according to journal procedures and standards.

We sincerely thank to 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.

We greatly appreciate expert work Prof. Dr. C. Hakan Gür, head of organising board and scientific committee. We are grateful for his advice and assistance in selecting the papers from the aforementioned congress.

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