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 six spontaneous papers discussing mechanical and microstructure properties of various casting metallic and non-metallic ceramic composites.

The following papers have been included in this issue:

Decoopman et al. studied role of plastic deformation on the efficiency of a nitriding treatment. To increase the hardness at the surface of ion-nitrided stainless steels, a plastic deformation by tensile loading is performed previously to the nitriding treatment. Plastic deformation leads to an increase of the dislocation density which can speed up nitriding diffusion process. Different plastic strain rates on the hardness variation were studied. In order to obtain hardness values in the first 20 microns in depth, a simple model based on indentations performed at the modified surface is originally proposed. The predicted hardness-depth profile in different cases of work-hardening clearly demonstrates the efficiency of prior plastic deformation on the global hardness improvement of the nitrided stainless steel.

Ganesh and Ramanaih discuss effect of heat treatment on dry sliding wear of Ti-6Al-4V and Ti-6Al-7Nb implant alloys. These alloys have high coefficient of friction and poor abrasive wear resistance which results in wear of the implant during its fixation in the body. The corresponding wear of implant results in the accumulation of wear debris in the body tissues which results in inflammation, pain and loosening of implant resulting in shorter life period. Both Ti-6Al-4V and Ti-6Al-7Nb implant alloys are heat treated above their transformation temperature followed by slow cooling in furnace, air and water. Specimens were further aged at 550°C and tested for dry sliding wear properties against hardened steel disc using a pin- on-disc wear testing apparatus. Weight loss method with an optimal load of 50N and a sliding distance of 500 m was considered at wear test. An improvement in wear rate was observed under different heat treatment condition and also high wear resistance of Ti-6Al-7Nb as compared to Ti-6Al-4V is reported.

Godoy et al. described stress redistributions in unit cells of fibre-reinforced polymer composites with interface degradation. They identify the stress redistributions that take place at the unit cell level, in which damage has already occurred due to an independent process. A deterministic approach is carried out. Damage is modelled by means of interface defects, in which the number and size of defects are considered as parameters of the damaged configuration considering material properties. The results show the extent of damage propagation to be expected in several configurations with inhomogeneities.

Davidenko introduced the metrologic fundamentals of ultrasonic echo-amplitude defectometry. He used differential representation of sensitivity of ultrasonic testing instead of minimum thresholds defects detection. Real defects are replaced by their models in the form of round normal discs, giving signals, equivalent to them: amplitude and delay. Acoustic field of echo-channel of transducer was considered as a means of measurement in ultrasonic echo amplitude defectometry. For FS of echo-signal of each kind their maximums are distinguished and optimum parameters of UEA are determined: position of time window to isolate the desired echo-signals from equivalent reflectors; discreteness of measurement of amplitude of echo-signals to provide the required accuracy of UEA defectometry and optimum moment for readout of the desired echo-signals in the process of manual scanning of the test object.

Bouafif and Koubaa study creep behaviour of HDPE/wood particle composites. Short-term creep tests at different temperatures were carried out and modelled using the Burger's model and the Findley power law. The creep of the composites was found to increase with temperature due to the mobility of the amorphous bulk and tie HDPE molecules. Increased wood particle content generally decreased the creep level. Injection and compression processes led to better creep behaviour than the extrusion process due to differences in the composites microstructures. Findley power law led to better prediction of long time creep behaviour of the composites and did not particle sizes influence it.

Kalaiselvan and Murugan presented dry sliding wear behaviour of Friction Stir Welded (FSW) aluminium composite. Different weight percentage of B_4C particulates reinforced Aluminium Matrix Composites (AMCs) are fabricated by modified stir casting route. The produced composite are FSW. Dry sliding wear properties of nugget zone of the FSW composites were analysed using a pin-on-disc wear testing machine. The presence of B_4C particulates and fine grain in the weld nugget improved the wear properties. The relationships between the wear rate of composites and friction stir welding process parameters were established using a regression model.

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.