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## Editorial

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This is the second year our journal has become a bimonthly, which means six issues per year. Such a frequency of issues requires very intense cooperation of authors, the Editor and reviewers to make the period between the receipt of a paper in a reviewing process and its acceptance for publication as short as possible. It is our goal to assure the independence of reviewers in the individual thematic fields, which will eventually contribute to an increased quality of papers published.

The papers published in the present issue treat investigations conducted on various fields of materials and materials properties.

Casteletti et al. determined appropriate temperatures for ion nitriding and nitrocarburising of AISI 316L austenitic stainless steel and ASTM A 890 GR 5A super-duplex stainless steel, respectively, and their influence on the corrosion resistance. Specimens were treated at 400°C, 450°C and 500°C and characterised by optical microscopy, X-rays diffraction and corrosion tests. Layer thickness increased with the treatment temperature for both steels. Potentiodynamic corrosion tests showed that for both steels after nitriding and nitrocarburisation show better corrosion resistance.

Luo et al. discussed the microstructures evolution and composition shift of austenitic steel after carburising. By means of SEM, EDS and X-ray diffraction they proved that the Cr content in  $M_7C_3$  increased to 48.84%, whereas only 2.89% remained in austenite; and Ni shifted into austenite to 41.67%, but 4.37% remained in carbide. This composition shift resulted in Cr dilution of the austenite, and the progressive growth of the  $M_7C_3$  carbide, reaching over 50µm in diameter. Their findings reveal that it is important for the radiant tube made of the steel to obtain anti-carburising on its outer surface and anti-oxidising performances on its inner surface.

Mutlu et al. studied the effect of grain size on the on the velocity of ultrasonic waves and ultrasonic attenuation in stainless steels AISI 304 and AISI 316. They demonstrated the capability of ultrasonic techniques in the assessment of the different grain sizes after heat treatment processes of AISI 304 stainless steel. AISI 316 stainless steel specimens were produced by casting and tested in as-cast condition. Velocities of ultrasonic longitudinal and transverse waves were measured by means of pulse-echo method using contact type normal beam probes with 1 and 4 MHz frequencies. The results showed that ultrasonic longitudinal and transverse wave velocities and attenuation coefficient decreased with increasing grain size of the specimens.

Ramadoss and Rajadurai researched forming limit analysis of AISI 316L and AISI 316LN-Austenitic stainless steels. Micro structural aspects, tensile properties and formability parameters were experimentally determined. They established that the effect

of nitrogen present in the 316LN stainless steel increases the strength and decreases the formability. The SEM images were correlated with the fracture behaviour and formability of the sheet metal.

Elangovan et al. presented research of effect of welding speed and tool pin profile on tensile properties of friction stir welded AA6061 aluminium alloy. Their investigation an attempt has been made to understand the effect of welding speed and tool pin profile on tensile properties of friction stir weld. Macro and microstructures of the joints were analysed using optical microscope. Their investigation found that the joints fabricated by square pin profiled tool exhibited superior tensile properties compared to other joints.

Raj and Daniel worked on microstructural influence in closed cell aluminium foam for structural application. Two sets of aluminium foams were made by degassing the calcium stabilised aluminium melt with titanium hydride. One set contained  $\text{Al}_{20}\text{CaTi}_2$  and  $\text{Al}_2\text{Cu}$  dispersion in the cell wall matrix, whereas, the second set contained  $\text{Al}_{13}\text{Fe}_4$  particles, along with the other intermetallics. The foam containing iron intermetallics as elongated platelets of higher aspect ratio showed excellent foam stability and higher plateau stress. However, there is a gradual decrease in stress levels in the plateau region during the compression test. This behaviour reduces the advantage of obtaining high energy absorption per unit volume.

Rivolta and Pinasco studied the age-hardening in a Au-Cu-Ag dental alloy with Pt and Pd additions. They investigated microstructures with light optical microscope and scanning electron microscope supported by, energy dispersion X-ray analysis. The dilatometer has proved useful to give good information on the heat treatment parameters. The metallographic analysis has shown that the microstructure is modified with the presence of discontinuous precipitation on the grain boundaries only after treatments at temperatures starting from 260°C, which is important for the manufacturing of dental prothesis.

Jaromír and Katarina Audy presented experimental study of authenticity of a 15th century bell imported to Australia from Italy. The experiments were focused on evaluation and characterisation of the bell from designing, forming and casting point of view. A principal intention of this study was to identify features that relate to the quality of this bell. The major focus was on such interrelated aspects as bell design and sound development, forming process and decoration/surface roughness, and finally the alloy type – composition and constitution. The results showed strong similarities between experimental and reported data. It confirmed that this unique bell was indeed cast in early middle ages.

Special thanks are due to the authors of the papers and particularly reviewers, who ensured high quality of the papers published in the present issue.