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(Processing, Fabrication, Properties, Application)

bonding strengths of HAp and SPU on the surface of the titanium alloys are also important issue. Then, the bonding strengths of HAp and SPU on the surface of the low modulus β–type titanium alloy (TNTZ) are also discussed.

46 Critical issues in friction stir welding of high strength aluminum alloys

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There is great potential for using friction stir welding (FSW) as a joining technology for production of unitized structures in the fabrication of aerospace vehicles. However, optimization of FSW properties in highly alloyed, high strength, aerospace aluminium alloys requires careful consideration of a number of factors beyond merely producing defect free welds. In order to obtain the best and most homogeneous weld properties (with respect to matching of base metal properties) it is critical to how best to achieve the following goals: (a) maximization of welding speed, (b) reducing quench time from welding temperature, (c) prevention of overheating (which can lead to local melting), and (d) minimization of residual stresses. In addition, it is critical to limit in–plane welding forces so that acceptable tool life can be achieved. Not all of these goals and constraints are compatible but, optimum trade–offs can be achieved by proper choices of thermal boundary conditions, welding parameters, tool design, and initial base metal temper. In this presentation, a wide range of examples from FSW of both 2XXX, and 7XXX series alloys will be shown which illustrate various successful and not so successful strategies for weld property optimization in these important alloy classes.

47 Enhancement of titanate nanotubes dispersion for reinforcement of nylon–11 nanocomposites

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The purpose of the present study was to investigate the effect of titanate nanotubes (TTNTs) dispersion in the mechanical properties of Nylon 11 (polyamide 11) polymer. According to the existing literature small amounts of TTNTs used as reinforcement in polymer matrix improve properties such as tensile strength and stiffness. However, the addition of these nanoparticles may also lead to a decrease of strength of the composite if the nanotubes are not well dispersed in the polymer matrix. In this work two different routes were investigated to enhance the dispersion of TTNTs used as a reinforcement of nylon–11 matrix nanocomposites: (1) chemical functionalization with 3–aminopropyltriethoxysilane; and (2) treatment with 2 kinds of surfactant – a cationic (CTAB) and an anionic (SDS). Characterization of the nanotubes was done by infrared spectroscopy, CHN elemental analysis, measurement of the specific surface area, thermogravimetric analysis, scanning electron microscopy and transmission electron microscopy. Nylon–11 matrix nanocomposites were manufactured by microextrusion-microinjection and reinforced with 0.5 to 2.0 wt.–% of functionalized and surfactant treated nanotubes. Finally, mechanical and thermal properties as well as the microstructure of the nanocomposites were evaluated. The presentation will discuss the results and potential applications of these materials.