

Assorted Content in Materials

Environmental worries have demanded for new materials and processes in several sectors of Engineering and of the modern life, which was supported by specific legislation on the subject. For example, nowadays the use of heavy metals, such as lead, still very much used in Sn-Pb welds, is made under control. Alternatively, there are developments (11062) for the use of Sn-Zn alloys for that application. Other non-ferrous materials have also been studied with the objective to get to know their metallurgical properties under mechanical milling conditions (11077). A refinement of the structure was found by increasing the mechanical milling time of copper and chromium powders, with progressive decrease of the crystallite size and of the lattice parameter, producing a metallic alloy by the solid solution of Cr into Cu.

Surface Engineering has advanced with new processes and by the suitable control of the surface produced. The biocompatibility and improvement of titanium bone integration has been reached with the production of surface oxides and nitrides by laser beam irradiation (11014). Alternatively, the corrosion resistance within synthetic saliva was evaluated for the case of commercially pure titanium, with and without the presence of a hydroxyapatite coating (11059). It was also verified that the tribological properties and the corrosion resistance of an ion nitrided steel are improved by submitting it to a post-oxidation treatment (11058). A distinct method for the plasma ion nitriding of steel included the use of a “cathodic cage”, resulting on the elimination of problems related to edge effects on the sample, allowing for the generation of uniform surface layers (11073).

Particular conditions for the practical application of materials have created the need to determine with precision values of their mechanical resistances, for which specific experimental procedures have been established for metal/fiber metal laminates (11064), WC-Co hard metal tool material (11080), laying mortars for structural masonry (11076) and high mechanical reliability dielectric tempered glass (11056).

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