J Material Sci Eng 2013, 2:4
http://dx.doi.org/10.4172/2169-0022.S1.012

OMICS Group Conferences
Accelerating Scientific Discovery

2nd International Conference and Exhibition on
Materials Science & Engineering

October 07-09, 2013 Hampton Inn Tropicana, Las Vegas, NV, USA

Effect of γ '' and γ ' precipitates on the properties of Cu-Be alloy

M. I. Masoud[1,2], Era H.[3] and Kishitake K.[3]
[1]Northern Border University, KSA
[2]Fayom University, Egypt
[3]Kyushu Institute of Technology, Japan

Effect of γ '' and γ ' precipitates on the properties of Cu-Be alloy have been investigated by many researchers. The hardness changes measurements, differential scanning calorimetry (DSC), dilatation analysis and transmission electron microscopy (TEM) were used in this study to investigate the effect of the precipitated phases for the cold rolled and non-deformed specimens during isothermal and low heating rate aging of 2^0/min. Through an isothermal aging, the hardening and contraction strongly increased at an early aging time for the cold rolled Cu-Be alloy. In addition, the DSC curves revealed an exothermic peak from γ '' phase. This peak increased and shifted to lower aging time by increasing the cold rolling reduction.

On the other hand, with 2^0/min aging, the hardness remarkably increased at lower aging temperatures for the cold rolled specimens. Additionally, the contraction from the dilatation curves and the exothermic peaks shifted to lower temperature with cold rolling. The hardening of Cu-Be alloy is believed to be from phase γ ', but the contraction of the alloy and the first exothermic peak in DSC curves from phase γ ''. TEM observations are in a good agreement with the above explanation and strongly revealed that γ '' and γ ' phases highly accelerated by the effect of cold rolling.

ibrahim_64@yahoo.com

Influence of surface topography and physicochemistry on wettability of tetragonal zirconia polycrystal (TZP)

Masao Yoshinari
Tokyo Dental College, Japan

Surface modification technologies are available for tetragonal zirconia polycrystal (TZP) to enhance its bioactivity and osseointegration capability for biomedical fields. The surface wettability is one of the important factors in the process of osseointegration, possibly regulating protein adsorption, and subsequent cell behavior. The aim of this study was to clarify the effect of topographical or physicochemical modification of TZP ceramics on wettability to determine the potential of such treatment in application to dental implants. Several types of surface topography were produced by alumina blasting and acid etching with hydrofluoric acid; surface physicochemistry was modified with oxygen (O_2) plasma, ultraviolet (UV) light, or hydrogen peroxide treatment. The obtained specimens were also subjected to storage under various conditions to evaluate their potential to maintain superhydrophilicity. The surface wettability was evaluated by measuring the contact angle against distilled water. The modified surfaces were also analyzed using an X-ray photoelectron spectroscopy (XPS). The results showed that surface modification of surface topography or physicochemistry, especially of blast/acid etching as well as O_2 plasma and UV treatment, greatly increased the surface wettability, resulting in superhydrophilicity. XPS analyses revealed that a remarkable decrease in carbon content and the introduction of hydroxyl groups were responsible for the observed superhydrophilicity. Furthermore, superhydrophilicity was maintained, even after immersion in an aqueous solution. These results indicated that topographical and physicochemical modification with O_2 plasma and UV treatment to TZP and subsequent immersion in aqueous solution is promising methods for creating superhydrophilicity, leading to important factors in osseointegration for dental implants.

Biography

Masao Yoshinari earned his Ph.D. in Dental Materials Science in 1986 from Tokyo Dental College. He is the Director of Division of Oral Implants Research, Oral Health Science Center, Tokyo Dental College. He has published more than 100 articles in reputed journals and book chapters including surface modifications of titanium for implant use, fatigue properties of ceramics, and corrosion characteristics of dental alloys.

yosinari@tdc.ac.jp