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Characteristics of 14K white gold by age-hardening treatment

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Because of beautiful glossy and color, the value of gold leverage is very high in Europe. For improve the quality of white gold, we performed heat treatment on 14K white gold alloys at various age-hardening conditions. Age-hardening behavior and the related phase transformation changes were studied to elucidate the hardening mechanism of 14K white gold alloys. For solid solution treatment [ST], casted 14K white gold alloy specimens were treated at high temperature (750 ˚C) during 30 minute, and the specimens dropped to water for quenching immediately. For Age-hardening treatment [AT], the specimens were treated at various temperatures (250 ˚C ~ 300 ˚C). After the heat treatment, we observed increased hardness from 144 Hv to 214 Hv by Vicker's hardness tester. Variation of the grain size measured by optical microscopy (OM) and scanning electron microscopy (SEM) images. By electron probe micro-analysis (EPMA) mapping analysis, we investigated that irregular particles were changed uniformly. After heat treatment, 14K white gold alloys showed improved hardness and became uniformity of grain size by age-hardening treatment.

Keywords: Age-hardening, hardness, grain size, solid solution treatment

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Establishment of Optimum Deposition Time in Electrophoretic Deposition

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We used the electrophoretic deposition (EPD) process to fabricate a glass composite and investigated the EPD parameters to find the optimum deposition time by understanding the relationship among the process parameters of zeta potential (ZP), pH, deposition yield and saturation point. A binder and a dispersing agent were mixed properly with glass frit (0.2~25㎛, d50＝8.77㎛) in an ethyl alcohol medium for the preparation of the slurry. The pH and ZP were in an inverse relationship to each other due to the generation of H_3O^+ ions with the addition of the dispersing agent in the slurry. The acidic nature of the dispersing agent was resulted in a decrease of the pH and an increase of the ZP. Otherwise, the pH increased with the addition of the glass frit in the slurry because H_3O^+ ions were absorbed on the glass frit. Therefore, the OH^- ions correspondingly increased. The saturation point of EPD was strongly correlated with the variation of the pH in the slurry; this is caused by a chemical reaction between the ethyl alcohol and the ions that make up the glass frit. An adjustment of the pH variation and the saturation point in the slurry can be established with respect to the optimum deposition time in the slurry.

Keywords: Electrophoretic deposition, Glass composite, Deposition time, Saturation point