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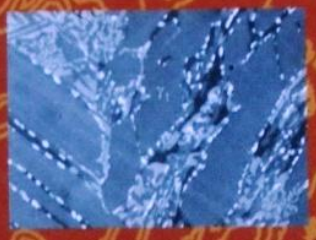

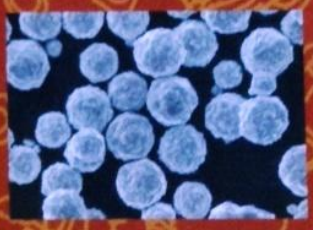

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Poster Presentation

Stone-in-Place Jewelry Casting: Influence of Sprue Design on the Change of Sapphire Color

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Abstract

Stone-in-Place casting is a well known technique using for jewelry manufacturing especially for high-end jewelry as well as high precious items [1-2]. The most advantage of this technique is a reduction in high cost and time sawing. The gemstones were set in the wax pattern prior to burn out and casting process.

In this study, two different sprue designs were used to study the effect of the molten on color change sapphire. The casting process was performed by melting the sterling silver (92.5 wt%Ag) at 1050°C with the mold temperature of 500°C and 600°C. For preventing the damage of gemstone from thermal shock, the mold was placed for air quenched at 30 and 90 min followed by water quench. It was found that the molten effect directly to the color change of sapphire from deep blue to yellowish-blue according to the change in oxidation state of Fe^{2+} to Fe^{3+}. For metallurgical session, hardness and microstructure of the sterling silver were investigated by Vicker Microhardness, Optical Microscope, Scanning Electron Microscope equipped with Energy Dispersive X-Ray Spectrometer.

References

1. H. Schuster, Innowative mold preparation and cutting for very thin and high precious items, The Santa Fe Symposium on Jewelry Manufacturing Technology, 2009, 359-377.
2. H. Schuster, Stone-in-Place casting for high-end jewelry, The Santa Fe Symposium on Jewelry Manufacturing Technology, 2010, 283-294.

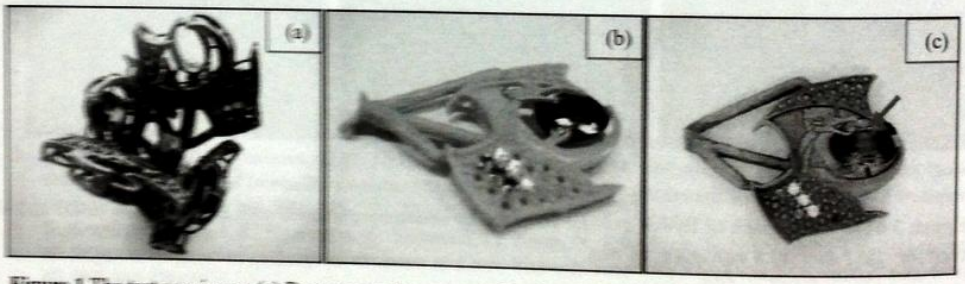

Figure 1 The test specimens (a) Bronze tree (b) stone setting in wax piece and (C) color change after casting

Figure 2 Microstructure of sterling silver (a) optical micrograph and (b) backscattering electron image

Poster Presentation

Improvement of Ag-Cu-Ge Jewelry Alloy by Age-Hardening

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Abstract

This subject was aim to study the improvement of Ag-Cu-Ge jewelry alloy by heat treatment. Hardness properties, tarnishing resistance and microstructure were investigated by Vicker microhardness, tarnish test, optical microscope (OM), scanning electron microscope (SEM) and energy dispersive spectroscopy (EDS). The as-received specimens were heated for solution treatment at 750°C for 60 min, quenched and aged at 300°C for 60-120 minutes. Like normal cast, dendritic structure of silver matrix (α-phase) were found. Copper (β-phase) sedimentation and lamella eutectic structure were normally form in the dendritic arms. EDS result shows Ge dissolution in β-phase which is high copper content. After heat treatment, eutectic structure existed in some areas which mean this experimental treatment cannot dissolve all the eutectic phase. However, hardness of Ag-Cu-Ge alloys was significantly improved from about 50 to 100 HV.