Conference report

22nd Santa Fe Symposium on Jewellery Manufacturing Technology, 18-21 May 2008 Albuquerque, New Mexico, USA

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This premier jewellery technology conference covered all the precious metals – gold, silver, platinum and palladium – and proved yet again to be stimulating and innovative, as well as furthering our understanding of jewellery technology and best practice. It started with **Basic Metallurgy of the Precious Metals Part II** by C W Corti, World Gold Council, UK, in which the development of microstructure through solidification and working was reviewed. The importance of controlling grain size was central to this presentation. The development of new white gold compositions using gallium as the primary whitener was discussed by A Basso, Legor Srl, Italy in his presentation **Development of 18K White gold Alloys without Nickel and Palladium**. This offers a new approach to nickel- and palladium-free white golds in the off-white and standard colour grades (see Henderson & Manchandra, *Gold Bull*, **38** (2), 2005, 55-67).

The problem of hard spots in carat golds, which lead to polishing problems, was analysed by D Zito, Progold Srl, Italy, in his presentation, **Hard Spots: A Trip through Ambiguity**. Many of these were found to be due to insoluble platinum group metals (PGMs) that can occur in the fine gold bars used to make the alloys.

A Zielonka, FEM, Germany, presented his research on **Incorporation of Gold Nanoparticles in Metal Matrix Systems**. This is achieved by a novel electroplating approach in which gold nanoparticles are dispersed during the electroplating of nickel. This is truly innovative and has considerable potential. The more conventional particulate approach to making jewellery was discussed by J Strauss, HJE Inc, USA, who updated the Symposium on **Powder Metallurgy in Jewellery Manufacturing**. He reported on several instances of commercialisation in Europe, USA and the Far East that are now emerging, not only for jewellery but also for precious metal watch cases and medical components.

On a more general theme, there were several presentations concerned with jewellery technology and practice: K Wiesner, Wieland GmbH, Germany discussed

the practical aspects of **Wire and Bar Manufacturing** for precious metal jewellery and Hubert Schuster, Consultant, Italy, spoke about **Stone-in-place Casting for High-end Jewellery**. The problems of defects in casting wax patterns was described by Patrick Sage, Neutec, USA, in his eye-opening presentation **Casting the Perfect Defect**. In particular, the malfunctioning of wax injectors was shown to contribute to the problem.

On the health & safety front, S Davis, Stern-Leach, USA, spoke about **Methods for Reducing Ergonomic Risk**, describing several examples of improvements to working conditions implemented at his company. In a similar vein, A Auberson, Cartier, USA discussed **Handling and Shipping at the Manufacture Stage**, in which he described how packaging of jewellery is a critical part of

Effect of Iridium in grain refining 18 carat yellow gold continuously cast tube (a) No iridium (b) with 0.01% iridium (Courtesy P. Beck)

Iridium inclusions in 18 carat gold

Cartier's product offering in order to preserve the top quality finish and condition of the piece delivered to the retailer and customer.

On a more theoretical level, B Lohwongwatana, Chulalongkorn University, Thailand, spoke about thermodynamic modelling in alloy design in his talk **Alloys by Design**. The property of hardness and the **Role of Hardness in Jewellery Alloys** was discussed by C W Corti, World Gold Council, UK, in which he concluded that all precious metal jewellery should have a hardness value of at least 100 HV for satisfactory performance, a problem often seen with some platinum and palladium jewellery, for example. The inconsistency of hardness data in the open literature was discussed in a round table discussion. The need for a standard testing procedure was identified and that some alloys can show differing hardness

Defects in wax pattern transferred to casting (a) Wax pattern (b) casting from wax pattern (Courtesy E. Bell and P. Sage)

Leaking wax injector with front cover removed (Courtesy E. Bell and P. Sage)

values from cast surface to bulk alloy was of concern. **Company Social Responsibility: The Way Forward** was discussed by S Grice, Hoover & Strong, USA and his company's lead in moving to ethical supplies and approach to their business was reviewed. All gold used in alloy production is recycled scrap from their in-house refinery and not from mined gold.

Other papers presented were concerned with casting of platinum alloys from CAD/CAM models (T Fryé, Techform), and investment casting of palladium alloys (P Battaini, 8853 Spa and also J Fischer-Bühner, FEM), the use of lasers in making platinum jewellery (J Maerz, PGI), the lost wax casting of glass (L Drogos, Au Enterprises inc) and a new electromechanical pre-polishing process for silver (M Robinson, ACH & Co, PRC) that reduces process time considerably. Some pertinent comments on so-called Tarnish-proof sterling silvers were presented by J Strauss (HJE Inc) and a new passive ceramic powder flux for soldering was described by O Passe (Nventa

Inc). **Designing for Rapid Manufacturing and other Emerging Technologies** was a stimulating look into the future, presented by G Penfold (JLIC, University of Birmingham City, UK)

The annual SFS Awards went to: Damiano Zito (Research Award), Paolo Battaini, (Ambassador Award), Tina Schnyder, MISA (Technology Award), Steve Adler (Industry Leader Award), Marcus Actis-Grande (Collaborative Research Award), Klaus Wiesner (Applied Engineering Award) and Boonrat Lohlongwatana (Outstanding Technical Presentation). A Lifetime Achievement Award was presented to Dr John McCloskey, recently retired from Stuller Inc, USA. John presented at the original Santa Fe Symposium, back in 1987 and has made many significant contributions to further our knowledge and understanding in jewellery manufacture.

The book of the Proceedings and a CD of presentations is available from the Santa Fe Symposium (www.santafesymposium.org or tel: +1 505 839 3011).