

Presentation Abstracts

Geoforensic Passport – a Scientific Tool to Confirm the Origin of Doré

Dr Jonathan Jodry, Head of Laboratories & New Business Development, Metalor Technologies SA

Abstract: The “Geoforensic Passport”, is a brand new scientific approach which allows validating the origin of doré received at refineries. This new tool represents a real breakthrough as one will be able to systematically analyze the DNA of every gold doré, determine if its origin corresponds to its stated source, but also to detect any inconsistencies or identify gold of dubious origin. This approach is now routinely used at Metalor Technologies to scientifically confirm the origin of the doré received at its refinery.

Bio: Based in Switzerland, Jonathan J. Jodry currently holds the position of Head of Laboratories & New Business Development at Metalor Technologies, a company he joined in 2009. In those roles, he is involved in the analytical activities of the laboratories of Metalor on three continents, as well as the development of new products and services for the company.

He is also heavily involved in trade associations, including IPMI – he serves as the chair of the Award Committee, is in the board of the IPMI Foundation and is current President of the European Chapter. He is also elected at the Management Committee of the LPPM (London Platinum and Palladium Market), and represents Metalor as one of the five referees appointed by both the LPPM and the LBMA (London Bullion Market Association). Finally, Jonathan also chairs the ISO/TC 174, the technical committee writing international standards for precious metals, jewellery and gemstones. Jonathan got his PhD at the University of Geneva in 2000 in organic and supramolecular chemistry, before spending 8 years in Japan. He also holds two Executive MBAs from London Business School and Columbia University of New York.

ISO TC 174 – ISO Standards for the Precious Metals Industry

Dr Jonathan Jodry, Head of Laboratories & New Business Development, Metalor Technologies SA

Abstract: The ISO Technical Committee 174 (ISO/TC 174), covers the fields of jewellery, diamonds, gemstones and precious metals; this committee involves 40 countries and handles more than 25 international standards. This committee is key in formulating standardization in the field of jewellery (e.g. numbering system, sizes of rings, precious metals colours and coatings, diamonds) and precious metals (e.g. analyses, sampling, impurities).

Optimization of Standardless XRF Analyses of Precious Metals using Empirical Data

Timothy Zembryski, Chemist, Sabin Metal Corporation

Abstract: Standardless x-ray fluorescence spectroscopy is a powerful tool for rapid analysis of unknown samples. Instead of traditional calibration with known standards, the instrument is calibrated using theoretical equations and fundamental parameters. Assumptions made in the equations can be inaccurate depending on the sample due to matrix effects. Many programs are available for XRF analysis using standardless methods that can account for matrix effects and allow specific correction factors for sample families. These correction factors can be determined by comparing the semi-quantitative XRF analyses to empirical results, such as fire assay and ICP analyses. A group of petrochemical catalyst samples showed low and inconsistent XRF results compared to more accurate analytical methods for palladium. Evaluation of the groups' matrices revealed an unaccounted influence of zirconium on the palladium signal from the instrument. Application of correction factors to the XRF-processing software significantly increased the precision and accuracy of the XRF analyses.

Bio: Tim has been employed as a chemist at Sabin Metal Corporation for two years. He earned his BS in biochemistry from SUNY Fredonia where he worked on NMR structures of drug-bound mRNA. He is currently pursuing an MS in chemistry at the Rochester Institute of Technology.

Publications: JL Chen, P Zhang, M Abe, H Aikawa, L Zhang, AJ Frank, T Zembryski, C Hubbs, H Park, J Withka, C Steppan, L Rogers, S Cabral, M Pettersson, TT Wager, MA Fountain, G Rumbaugh, JL Childs-Disney, MD Disney, "Design, Optimization, and Study of Small Molecules That Target Tau Pre-mRNA and Affect Splicing." J. Am. Chem. Soc. 2020, 142, 19, 8706–8727.

Precious Group Metals Analysis using a Newly Designed Inductively Coupled Plasma Spectroscopy System Resulting in Improved Accuracy and Precision

Paul Krampitz, Applications Scientist, Agilent Scientific Instruments

Abstract: The precious metal catalyst (PMC) market world wide is approximately 15.8 billion per annum and estimated to increase to 22.3 billion by 2027, with a GACR of 5.1%. Profitability of reclaiming these precious metals is very dependent on the accuracy of the determination. 0.5% accuracy or tighter is a typical requirement. Achieving this on an ICP is not trivial with typical uncertainties of 1% for the technique. The following work will highlight Pt, Pd, and Au stability and accuracy. Also, HCL and Nitric Acid need to be kept consistent and is typically not quantified using ICP. However, data is presented by analyzing both chlorine and nitrogen to ensure consistent digestions.

The newly designed Agilent 5800 ICP was used for this project. Focus and resolution have improved dramatically leading to less interferences and tighter % R.S.D. per measurement due to increased sensitivity. Deconvolution techniques have improved signal to noise ratios and eliminated interferences. Using confidential drift correction techniques and up to 16 wavelengths per analyte will show accuracy improvements to less than 0.5 % and precision improvements to less than 0.3 %.

PhotonAssay for rapid, non-destructive analysis of gold and silver

Dr. James Tickner, Chief Technology Officer, Chrysos Corporation

Abstract: PhotonAssay is a novel analytical technology that combines the speed and convenience of X-ray analysis with the precision and sensitivity of classical laboratory methods. Working at much higher energies than traditional X-ray fluorescence (XRF) allows true-bulk analysis of gold and silver in samples weighing 500 g or more. This talk will introduce the technology, present results from extensive validation studies and describe the operation of PhotonAssay units in laboratories around Australia.

Bio: Dr James Tickner is the Chief Technology Officer and co-founder of Chrysos Corporation and the inventor of PhotonAssay. Prior to joining Chrysos he worked for more than 18 years at CSIRO, Australia's national applied research agency, where he led a research team developing a wide range of instruments to solve challenging measurement and imaging problems in the minerals and security industries.

Sodium Peroxide Fusions: Applications for Sample Preparation with a Focus on Catalysts and the Rarer Platinum Metals

Lou Britton, Chemist, Auris Noble LLC

Abstract: Sodium peroxide fusions are a useful sample preparation technique when applied to certain materials that resist quantitative dissolutions in aqua regia or hydrofluoric acid. It is particularly useful for the solubilization of autocatalyst, ruthenium, iridium, and alloys of the platinum group metals. Discussed in this presentation is a general overview of its usage in the analysis of precious metals.

Bio: Lou Britton is a chemist with Auris Noble, a company that performs reclamation and refining of precious metals with a particular focus on ruthenium, iridium, osmium and rhenium and difficult to process materials. Lou's background and education was in chemistry and materials science and he has been working with precious metals in a variety of capacities for nearly two decades.

Bureau Veritas- Presentation of Data from an Autocatalyst Proficiency Testing Exercise

Presenter TBD

Abstract: The presentation provides an overview of the results achieved in a Bureau Veritas internal round robin exercise which was extended to include a number of third party laboratories. Two samples were prepared for this exercise and sent to more than 20 laboratories worldwide. All of the data reported has been included in the assessment principally by applying simple z-score analysis. The presentation has been neutralized to protect the identities of all participants involved.

Ask the Experts:

Autocatalyst Sampling and Analysis Panel Discussion

Abstract: We have assembled several experts in the field of sampling and analysis of auto catalyst material to enlighten everyone on what goes into preparing a settlement sample from a bul lot and the process of determining the value of the precious metals contained in the sample.