



Johnson Matthey

# Platinum Metals Review

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## Articles in this issue:

### ***Solving Problems in Catalyst Specificity and Selectivity***

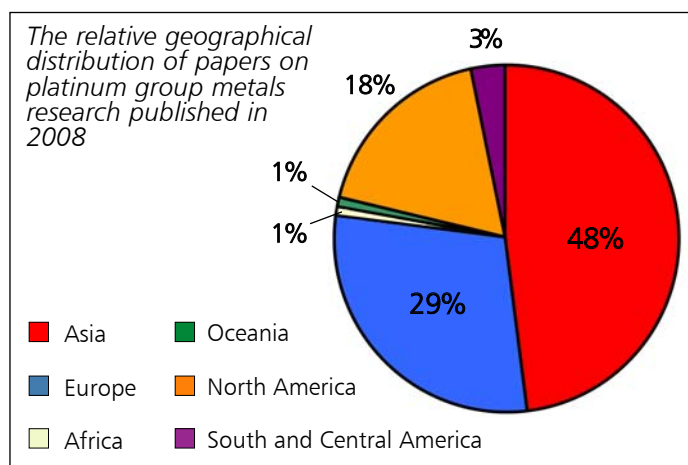
This review, by Robbie Burch at Queen's University Belfast, Lynn Gladden at the University of Cambridge and Stan Golunski, formerly at the Johnson Matthey Technology Centre, Sonning Common (all in the UK), describes how a greater understanding of reaction mechanisms developed during a groundbreaking collaborative research programme (CARMAC) has been used to optimise a number of platinum group metal (pgm)-catalysed industrial processes. Many chemical manufacturing processes can use mixed feedstocks, but require only one particular reaction from a range of possible chemical pathways. In these processes, the catalyst not only facilitates the chemical transformation, it targets specific reactants and channels them selectively down a particular reaction route. Catalysts based on pgms are highly effective, but this is a tall order and challenges remain – many of which have been addressed in this study.

### ***REACH Regulation and the PGMs***

REACH is the legal framework for the assessment of chemicals which aims to improve the European Union (EU) market in terms of innovation and competitiveness while also protecting human health and the environment. Caroline Braibant of the European Precious Metals Federation, Belgium, examines the response of the pgm industry and describes how a consortium of leading companies is working together to provide and register the information required by the regulation.

### ***Trends in Global PGM Research***

Helen Gavin, who works in technology forecasting and information at the Johnson Matthey Technology Centre (Sonning Common, UK), details how an analysis of non-patent scientific literature (such as journals, conference proceedings and books) can be used to reveal trends in research. The ten years from 1998 saw overall growth in research involving platinum, ruthenium, and to a lesser extent palladium and iridium, especially in China.



### ***Using Ultrasound to Test for Defects***

Devraj Singh and Pramod K. Yadawa (AMITY School of Engineering and Technology, India) show how non-destructive ultrasonic testing could be used to reveal the structure of metal ingots and other materials. In this theoretical study, addition of 4 at% platinum to copper, silver or gold reduces attenuation of the ultrasonic waves, indicating that bimetallic alloys with a higher platinum content are more ductile and likely to contain fewer defects in their crystal structure than those with a lower platinum content.

### ***PGM Protection for Glass Making***

Christophe Couderc of Johnson Matthey Noble Metals at Royston in the UK considers the benefits of pgm technology to the glass industry, especially in challenging market conditions. Even a well-established application for the pgms such as this is seeing innovation and efficiency improvements.



Left: The manufacture of high-quality glass benefits from the use of pgm protection, such as on this Danner sleeve which is used to make glass tubing for pharmaceutical components and is coated with platinum and then fully polished

### **Using Metal Scavengers to Treat Effluent**

This issue's Final Analysis from Joanne Frankham (Johnson Matthey, UK) and Pasi Kauppinen (Johnson Matthey Finland) demonstrates the use of Smopex<sup>®</sup> fibres to scavenge precious, base and heavy metals from waste streams, allowing effluent to be cleaned on site and preventing value loss.

### **Reviews:**

Jason McPherson, based at Mintek in South Africa, reviews the **CATSA 2009 Conference** at which current catalyst research in South Africa was showcased. A number of governmental and industrial research programmes are ensuring that the field continues to thrive in that country.

Fabrizio Nerozzi (Johnson Matthey Catalysis and Chiral Technologies, Royston, UK) covers the second meeting on **Challenges in Catalysis for Pharmaceuticals and Fine Chemicals**. The challenge for researchers is to meet the need in these industries for robust, environmentally friendly and safe processes.

**Catalyst Preparation for the 21st Century** is aiming for smarter synthesis methods which allow catalysts to be 'designed' as effectively as possible for each application. Simon Crabtree of Johnson Matthey Catalysts (at the Billingham site in the UK) and Peter Ellis of the Johnson Matthey Technology Centre at Sonning Common, UK, review a one-day symposium highlighting major advances towards this goal.

The Chief Scientist of Johnson Matthey, Martyn Twigg, reviews the third edition of **"Catalytic Air Pollution Control: Commercial Technology"**, by Ronald M. Heck (RMH Consulting, USA) and Robert K. Farrauto (BASF Catalysts, USA) with Suresh T. Gulati (Consultant to Corning Inc, USA). The first edition, published in 1995, was a significant contribution to an industry that has grown to become a multibillion dollar worldwide business, and this updated version provides real technical insight from an industrial perspective.

**"A Handbook of Synthesis of Precious Metals Compounds and Complexes"**, edited by Jianmin

Yu (Kunming Sino-Platinum Metals Catalyst Co, Ltd, China), includes information not previously available in Chinese. Tingjiang Ming (Johnson Matthey Shanghai Chemicals Ltd, China) finds it to be one of the most complete texts on the subject published in China to date.

Also included in this issue is a summary of Johnson Matthey's latest market survey of the pgms, **"Platinum 2010"**, which was published on 17th May 2010. In addition to its coverage of supply and demand, it includes special features on the Zimbabwean mining industry and the platinum jewellery market in China.



Above: Cutaway view of a catalysed soot filter (CSF) mounted directly on the turbocharger of a passenger car diesel engine (Image copyright Martyn V. Twigg)

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