

# Xstrata establishes research chair in Centre for Pyrometallurgy

The Centre for Pyrometallurgy in the Department of Materials Science and Metallurgical Engineering established a second research chair in February 2012 with the financial support of industry partner Xstrata plc. This chair will focus on research in pyrometallurgical modelling.

The Centre was established in 2009 when Anglo American established the Anglo American Chair in Pyrometallurgy. With the establishment of this chair, the company stipulated that its main purpose would be to address the shortage of academic resources, maintain quality tertiary tuition in pyrometallurgy, and meet core teaching outcomes specified by the Engineering Council of South Africa (ECSA).

As part of the conditions of the establishment of the chair, Anglo American suggested the establishment of a Centre for Pyrometallurgy supported by industry and government. The Centre for Pyrometallurgy in the Department of Materials Science and Metallurgical Engineering therefore became a reality on 30 May 2011.

The key aim of this Centre is to bring the Pyrometallurgy Group at the University of Pretoria and the South African pyrometallurgical industry closer together. It aims to strengthen communication, cooperation and support between academia and industry, and to further develop expertise in pyrometallurgy. Other objectives include the delivery of high-quality manpower in pyrometallurgy and the execution of internationally competitive applied research of interest to UP's industry partners.

It was envisaged that the Centre for Pyrometallurgy would eventually consist of a number of industrial chairs associated with different subdisciplines of pyrometallurgy and that close cooperation between the different chairs would take place, as

strong overlap exists between the different subdisciplines. The Anglo American Chair mainly supports the teaching drive of the Centre (undergraduate, postgraduate and in-house courses). However, other research focus areas in the Centre include the various subdisciplines of pyrometallurgical processes, refractory materials, waste materials and modelling, which will each be associated with an industrial chair.

The Xstrata Chair in Pyrometallurgical Modelling is the second of these envisaged chairs. It was officially inaugurated by Mick Davis (Chief Executive Officer, Xstrata plc) on 21 February 2012. The inauguration was combined with a workshop on pyrometallurgical modelling offered by experts in the field.

Effective modelling of pyrometallurgical processes can help gain a better understanding of an existing process, plan design improvements and develop new processes. It can aid in predicting how the process will respond to

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operational changes, and help estimate certain parameters of the process (some of which could be very complex to measure). Predictive models that will be developed in this group will be verified with experimental measurements and plant data as far as possible.

The modelling of metallurgical processes is an interdisciplinary

field of study, which can also advance cooperation with other metallurgical disciplines, such as minerals processing, and also lead to closer association with the departments of Mechanical and Aeronautical Engineering, and Electrical, Electronic and Computer Engineering. Through the Xstrata Chair, the Centre now has the opportunity to further develop its capability in the modelling of pyrometallurgical processes, not only in the thermodynamic modelling of processes, but also in kinetic, heat and fluid flow, and financial and multiphase modelling.

The first student projects, in which the skills of thermal modelling, economic modelling and multiphase modelling are developed, were started in 2011. These projects include an investigation into the effect of cooling conditions on the quality of platinum group metals (PGM) converter matte, multiphase modelling of the raw material granulation process and green bed permeability during the sintering of iron ore, the economic modelling of a ferrochrome furnace, the modelling of thermal profiles in a furnace wall, the evaluation of the degree of mixing within a converter process by using physical and computational fluid dynamics (CFD) modelling, and the development of a generalised mass, energy and thermal profile model of a typical chromite ore sinter belt process.

The Centre for Pyrometallurgy currently comprises four members: Prof Andrie Garbers-Craig (Director), Prof Johan de Villiers, Markus Erwee and Robert Cromarty. With the signing of the agreement between Xstrata South Africa and UP for the funding of the research chair, another three-year contract position has been secured. It is anticipated that the incumbent will join the Centre in due course. ➔



➔ Unveiling the plaque at the launch of the Xstrata Chair in Pyrometallurgical Modelling are (from left): Prof Roelf Sandenbergh (Dean: Engineering, Built Environment and Information Technology), Mick Davis (CEO: Xstrata plc), Prof Cheryl de la Rey (Vice-Chancellor and Principal) and Andile Sangqu (Executive Director: Xstrata South Africa).



➔ Mick Davis (CEO: Xstrata plc – sixth from left) and Andile Sangqu (Executive Director: Xstrata South Africa – third from right) with staff and students from the Centre for Pyrometallurgy. Staff include Prof Andrie Garbers-Craig (front row, fourth from right), Prof Johan de Villiers (front row, second from right), Robert Cromarty (front row, extreme right) and Markus Erwee (back row, middle).