

Journal Comment

Precious Metals 2013

South Africa has a rich resource in precious metals and other minerals and metals and has certainly used this to its benefit in the creation of great wealth and the provision of a substantial number of jobs for its citizens and those of neighbouring states. The question, though, is can more benefit be derived from this mineral wealth?

In a classic resource-based economy the wealth is limited, firstly by the resource itself and secondly by the rate at which it can be extracted from the ground. South Africa has by no means a resource-based only economy, as shown by the indicators that mining now contributes approximately 9 per cent directly to GDP and about a further 10 per cent indirectly. There is undoubtedly more to the local economy than mining alone; however, South Africa's exports continue to be dominated by unwrought precious metals and other metals and ores, and one always gets a sense of an opportunity missed here. Surely the greater value of minerals and metals lies in their utilization in the manufacturing of the myriad products that have come to dominate our modern lives, i.e. in their downstream value addition or beneficiation.

Possession of all this mineral wealth does not translate directly into a competitive advantage that is immediately capitalized on in downstream industry, and clearly other factors are at play in limiting this growth. What these are is, of course, the subject of much debate, but at least two probable factors are knowledge and skills. Knowledge and intellectual property and the ownership thereof are decidedly important in any transition from our emerging economy to a so-called knowledge-based economy that supports advanced manufacturing.

The Advance Metals Initiative (AMI) is a programme jointly established by the Department of Science and Technology (DST) and the science councils Mintek, the CSIR, and NECSA. Its fundamental goal is R&D-led downstream industrialization of advanced products based on metals important in the local context. The AMI is implemented in four R&D networks, namely precious metals (PMDN) and ferrous and base metals (FMDN), both at Mintek; new metals (NMDN) at NECSA; and light metals (LMDN) at the CSIR. These networks are tasked with innovating and developing technologies and products across the advanced metals value chain in platinum group metals and gold, iron and alloying base metals, zirconium, hafnium, tantalum, and niobium, and aluminium and titanium respectively.

Favoured outcomes of the knowledge gained in R&D in the AMI are commercialization in new industries, local manufacture of products currently imported, and enhancing the competitiveness of existing local industry. Since it is not thought that the onus lies strictly with either government or private industry to achieve greater levels of beneficiation in South Africa, linkages between the AMI and industry are strongly sought. In addition, to support the R&D conducted at the science councils, partnerships with several universities have been established and currently some 80 postgraduate students are sponsored across the four networks. This, it is believed, not only significantly enhances the pool of high-level skilled people needed to achieve the immediate goals of the AMI but also provides the sustained innovation that will be required to sustain any new commercial developments that emanate from the AMI.

This issue of the *SAIMM Journal* brings together a selection of the papers presented at the AMI-sponsored Precious Metals 2013 Conference held in Cape Town during October 2013. The conference, organized around the theme of precious metals in catalysis, chemicals, advanced alloys, and nanotechnology, was in part aimed at showcasing the R&D conducted mainly, but not exclusively, in the PMDN. Each year at the AMI conference students from all the networks can present on their research, and this year the conference included several papers highlighting the work being done in developing new chemistries for the separation of niobium, hafnium, tantalum, and zirconium.

Although one may hope that the R&D reported on is near commercialization, it is an unfortunate reality that the development of new knowledge and intellectual property with commercial potential is a long process, and most of the work presented is necessarily in the very early stages of development. Nonetheless, the papers should give an indication of the high level of research being conducted at various centres around South Africa and the promise held for new materials and processes in precious metals. The path to a knowledge-based economy is arduous, but if you don't start somewhere this goal can never be achieved, and as such the efforts of the AMI are worthy of high commendation.

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