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Guest Editorial

Meeting the Challenges in Security of Supply

Many of today's key technologies are reliant on the properties of specific elements, such as cobalt (Co), tellurium (Te), selenium (Se), neodymium (Nd), indium (In), gallium (Ga) and heavy rare earth elements (HREE) – collectively described as 'e-tech' elements. An example is low carbon energy generation.

Changing Energy Use

Significant changes in the way energy is generated and utilised are required to manage and control the impact of increased levels of greenhouse gases (GHG) in the atmosphere, and the elements listed above play an important role in many of the technologies being developed to achieve this. Up to now these metals have been produced in relatively small quantities and any rapid growth in low carbon energy technologies could be constrained by the availability of these special elements.

There is always a dynamic balance between the supply and demand for commodities – economic theory suggests that if demand exceeds supply prices will rise and this will stimulate the development of new sources of supply. However increases in supply may lag demand because it can take many years for a new mine to be developed.

Another factor to consider is that many of the 'e-tech' elements are produced as co-products from mining for other metals (for example Se and Te are byproducts from copper production). In addition the production of several of these elements is controlled by a small number of entities with primary production dominated by as few as one or two countries. It is also important to ensure that the UN's Sustainable Development Goals are incorporated in the development of primary resources (1).

During the last surge in metal prices there were concerns that the above factors could put pressure on the supply of these elements from responsible sources. This in turn could result in disruption of the deployment of low carbon energy technologies.

Security of Supply

The 'Security of Supply of MinEral Resources' (SoS MinErals) programme was developed by the UK's Natural Environment Research Council (NERC) and Engineering and Physical Sciences Research Council, (EPSRC), in partnership with industry and academia, and a Brazilian funding agency (FAPESP). The total funding is about £16 million.

This initiative focuses on the science needed to enhance the security of supply of strategic elements that underpin current and future 'green' energy technologies.

The programme will enhance the security of supply of some of the 'e-tech' elements in two ways:

- through improved understanding of element cycling and concentration in natural systems
- developing improved recovery processes from primary sources in order to mitigate the environmental impacts of the extraction and recovery of these elements.

The programme funds four competitively won projects that directly involve over 50 industrial partners and more than 25 universities and research organisations. It supports 24 postdoctoral research associates and 17 PhD researchers. The aim is to develop world-leading research and scientists.

Collaboration between all four projects is ongoing to enhance the training and development of this cohort of researchers. The programme aims to create links across the material supply chains through networking and outreach activities. It aims to promote cross-disciplinary understanding and enhance the connections between academic and business objectives. The purpose of this