

MinSouth 2024 YPLC Abstracts

Natural Hydrogen: A new frontier?

Long seen as a mere geological curiosity, natural hydrogen can offer a new tool to help reach net zero. Despite limited scientific understanding, there is still opportunities for extraction and exploration.

Hydrogen already is an essential ingredient in many processes, so sourcing this hydrogen in a more environmentally friendly manner can aid in reducing emissions, especially in otherwise hard-to-target industries.

With one site in West Africa already active for several years, and more exploration projects in the US, Australia and across Europe (notably in France and Spain), this is not just fantasy. There are parallels with the early days of oil and gas exploration and these industries are well-placed to use their technology and expertise.

This talk will address the reasons why natural hydrogen is a desirable resource, the current state of understanding of the 'Hydrogen system'- and investigate case studies from around the world to demonstrate the potential of natural hydrogen.

The magmatic controls on Ni-Cu-PGE mineralisation in the Platreef, northern limb of the Bushveld Complex, South Africa

Platinum-group elements (PGEs) are critical metals which are vital components in internal combustion engines, hydrogen fuel cells and battery technologies. The Platreef, northern limb of the Bushveld Complex, South Africa, is widely regarded as one of the world's largest PGEs resources. It differs from the wider Bushveld in several key ways, including PGE mineralization being spread over much greater thicknesses compared to deposits including the Merensky Reef and UG2 chromitite.

In this study, petrology and bulk geochemistry are examined to establishing the primary magmatic stratigraphy of the newly discovered deeper Platreef at Sandsloot. The Platreef is thought to have formed from discrete magmatic units, and several, including a barren zone, PGE-reef, and base metal zone, are identified at Sandsloot. Niggli Numbers, a forgotten but highly useful geochemistry tool, are used to demonstrate the key role of dolomite contamination in elevating PGE grades along the northern limb.

Evaluating Europe's Mining Renaissance

Recent years have seen heightened interest in the revival of Europe's mining economy. Spurred by the need to increase the bloc's resource security, the European Critical Raw Materials Act aims to diversify supply chains by mining 10% and processing 40% of the European Union's demand by 2030. In order to meet these ambitious targets, can the European industry navigate the headwinds of high costs, long lead times, and opposition? This dilemma will be discussed through the example of budding Scandinavian rare earth element

projects. Rare earths, especially heavy rare earths, have taken centre stage in the dialogue surrounding the EU's resource security. Representing an acute supply risk, these metals are the only commodity for which the EU's import reliance has been 100% for both mining and processing. Could new European projects serve to meet these targets by 2030, and crucially - what might happen in the meantime?