

New exploration marker identified for Western Australian mineral systems

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Working with the world-leading mass spectrometry facilities at Curtin

University's John de Laeter Centre, Professor Neal McNaughton and his research team have developed new methods for preparing and analyzing individual crystals of rutile to reveal hidden secrets of their chemical make-up that could help guide geologists searching for undiscovered ore deposits.

"Minerals like rutile are highly resistant to chemical and physical breakdown," explained Professor McNaughton.

"Individual crystals of rutile can survive unchanged even when the rocks that once hosted them have been weathered away over time—like tiny time capsules preserving a record of now-vanished geology."

Samples analyzed in the Curtin study showed a clear chemical distinction between rutile associated with richly endowed gold ore systems and rutile from un-mineralised rocks. This discovery highlights the potential [exploration](#) value of rutile in the ancient landscape of Western Australia.

"By using our new approach to analyzing rutile in the early stages of [mineral](#) exploration, geologists could quickly establish whether or not local rocks may have experienced a mineralising event" said Professor McNaughton.

In releasing the research report describing Professor McNaughton's findings, MRIWA CEO Nicole Roocke said "This research provides Western Australia's mineral exploration companies with a new way of quickly refining their search for undiscovered ore bodies."

"This represents an important step towards faster and more efficient exploration to support the discovery of the next generation of ore deposits hidden beneath the surface of the state."

"By supporting this research, the Western Australian government is

helping our exploration industry develop the tools it needs to succeed."

The formation of an ore body affects surrounding rocks, creating a chemical 'signature' of mineralisation many times larger than the ore body itself.

Despite showing promise as a recorder of such chemical signatures, evaluation of rutile has not been progressed.

The robustness of rutile would make it a particularly effective indicator mineral under deeply weathered conditions commonly encountered in Australian exploration.

This research has established experimental protocols for the extraction, identification, preparation and dating of individual crystals of rutile from a range of host [rock](#) types commonly encountered in Western Australian mineral exploration.

Analysis of Western Australian samples showed a clear [chemical](#) distinction between rutile associated richly endowed gold ore systems and rutile from un-mineralised (barren) rocks.

Although a similar distinct geochemical fingerprint has previously been reported for rutile from base metal deposits, analysis in this study did not clearly identify such a marker for the Western Australian deposits studied.

This study helps develop and establish a new analytical approach particularly well suited to mineral exploration under Western Australian conditions

This insight will support the development of more effective mineral exploration workflows and campaigns and could help de-risk investment

in under-explored areas of WA targeting the next generation of gold ore bodies.

More information: 4D Evolution of WA Ore Systems: Rutile – Pathfinder to Ores.

mriwa.sharepoint.com/sites/FinalReports/Shared

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Provided by Curtin University

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