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TUNGSTEN MINERALISATION AT THE OT JUA PROSPECT: A GEOLOGICAL AND GEOCHEMICAL INVESTIGATION*

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Two styles of tungsten mineralisation have been identified at the Otjua prospect. Firstly, fine-grained scheelite mineralisation is hosted by calc-silicate granofels rocks of the Khan and Oberwasser Formations. These granofels represent metamorphosed marls and are developed in an alternating sequence of biotite schist and minor carbonate units. Secondly, scheelite and fluorite mineralisation is developed in replacement bodies in carbonate units, the most economically significant mineralisation being hosted by the Rössing Formation marble. Three types or facies of skarn assemblage which represent varying degrees of replacement of the Rössing Formation have been identified. The garnet facies of skarn hosts the majority of the tungsten mineralisation.

The Otjua prospect is situated on the southern side of a major F_3 domal structure that has been intruded by a latestage Damaran granite (the Otjua granite) and associated pegmatites. The granite is geochemically specialised and possesses anomalously high $\delta\ ^{18}O$ and ($^{87}Sr/\ ^{86}Sr$), values of 15.1 and 0.7196 respectively. Whole rock, mineral chemistry and stable isotope studies show that the skarn-hosted scheelite mineralisation has been derived from the Otjua granite. The skarn facies development and variations in mineral chemistry within the skarn system are similar to those present in skarns in the North American cordillera, though the absence of accompanying molybdenum, sulphide mineralisation and hydrous silicate assemblages make the deposit unusual.

The tungsten mineralisation hosted by the granofels is considered to result from syn-sedimentary concentrations of the metal in the marls. It is postulated that the tungsten was derived from a deep-seated fracture such as the Omaruru lineament in Nosib and Lower Swakop times. This study suggests that geochemically specialised granites such as the Otjua granite were produced as the result of large scale anatexis of scheelite-rich metasediments during the final stages of the Damara orogeny. A striking similarity between the distribution and development of granite-related uranium and tungsten mineralisation in central SWA/Namibia is noted.

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