

## Geology and Mineralization Characteristics of the Modi Taung Orogenic Gold Deposit, Central Myanmar

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The Modi Taung gold mine is located about 75 km northeast of the Myanmar capital, Nay Pyi Taw, Central Myanmar to the slight east of the Sagaing fault. The gold deposit occurs within the Mogok metamorphic belt, a north-trending zone related to the suturing of the Sibumasu Terrane (a fragment of Gondwana), and the West Myanmar Terrane. The deposit is hosted in shale and sandstone sequence of Paleozoic age. Three auriferous veins strike northwest and dip steeply but appear to converge at depth; these are the Htongyi vein system, the Sakhangyi vein system and the Shwesin vein system. Textures vary between the veins, from massive, laminated book and ribbon to breccia veins. Gold occurs in the veins and host shale unit accompanied by minor base metal mineralization such as chalcopyrite, galena and sphalerite. The veins comprise high-grade mineralisation, typically between 10 to 300 g/t Au (sometimes up to 3000 g/t Au). The selvage to the veins may have accessory amounts of pyrite and depending on the sulfide content may carry between 1 and 5 g/t Au.

LA ICP-MS U-Pb zircon dating and Pb isotope studies on igneous units which intrude the mineralized host rock zones provide ages of  $95 \pm 30$  and  $49 \pm 1$  Ma, respectively. Sulfur isotope analysis was undertaken on vein pyrite and shows a narrow range of slightly enriched  $\delta^{34}\text{S}$  values (+1.33–4.75‰). This suggests that mineralising fluids are likely to have been sourced from a magmatic or mixed magmatic and sedimentary reservoir. Pb isotope analysis suggests that lead has been sourced from crustal region, in this location is likely to be attributed to post-collisional melting following the suture of the Sibumasu Terrane and the West Myanmar Terrane. The observations stated above demonstrate that the Modi Taung gold deposit is likely to fit within the orogenic gold deposit model and is also comparable with the Bendigo Goldfield (Central Victoria) and the Selinsing deposit (Malaysia) in terms of structural setting, vein morphology and mineralization characteristics.

Pyrite grains found in sedimentary unit samples collected from the Shwesin system were mapped/imaged using LA-ICP-MS. Preliminary analysis of the data indicated that all pyrite cores (Py 1), are concretions of diagenetic micron scale pyrite grains enriched in Ni, Bi, Co, Al, Sb, Cu, Ba, Cr, with slight enrichment in Mn, Zn and Ti. Au and As are also found as enrichment rims around the Py 1 core. A second stage euhedral pyrite (Py 2) encapsulating the Py 1 core, is commonly found in Shwesin lower levels. This Py 2 is generally depleted in trace elements including Ni, As, Ag, Co and Au which show zonation bands of enrichment, a typical feature of metamorphic fluid pulses. A third type of euhedral pyrite (Py 3), surrounding Py 1 cores, is found in the upper levels of the Shwesin system. In contrast to Py 2, Py 3 shows enrichment in Ni, As, Ag and Au, with enrichment of Bi, Al, Sb, Mg, K and Pb in the outer rims. This suggests at least two-stage of enrichment of gold both in sedimentary environment and later magmatic-metamorphic conditions as evidenced by change in fluid chemistry and hydrothermal source.