

Epidote as a tracer of Cu-Au-REE mineralization in Iron Oxide Copper-Gold systems: Examples from the Mt Isa Inlier and Gawler Craton

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Epidote is a common hydrothermal alteration mineral associated with many types of ore deposits. However, outside of porphyry and epithermal systems, little is known about the geochemical behavior of epidote. Importantly, epidote's capacity to fingerprint the signature of the ore-forming fluid(s) is known only from porphyry systems [1]. Here we present trace element data on epidote from multiple iron oxide copper-gold (IOCG) deposits in Australia and Sweden. The results show that IOCG epidote is uniquely enriched in a suite of characteristic trace and minor elements, including Bi, V, Mn, and LREE. Moreover, there is a distinct paragenetic trend from early allanite to later epidote *sensu stricto* compositions. These geochemical characteristics contrast with epidote from porphyry Cu deposits, which are depleted in LREE and Bi but enriched in Pb and other pathfinder metals such as As and Sb. These results provide justification for the use of epidote geochemistry as a fertility indicator and vectoring tool in IOCG exploration programs worldwide.

[1] Cooke, D.R., Wilkinson, J.J., Baker, M., Agnew, P., Phillips, J., Chang, Z., Chen, H., Wilkinson, C.C., Inglis, S., Hollings, P., Zhang, L., Gemmell, J.B., White, N.C., Danyushevsky, L., and Martin, H. (2020), *Econ Geol* 115, 813-840.