The IOCG(U) Mineral System: Characteristics of K-Fe Alteration in the Northern Yorke Peninsula

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CHARACTERISTICS OF K-FE ALTERATION IN RELATION TO IOCG(U) MINERALISATION IN THE NORTHERN YORKE PENINSULA

ALTERATION & IOCG(U) MINERALISATION IN THE NYP

ABSTRACT

The Moonta-Wallaroo area in the Northern Yorke Peninsula (NYP) is inferred to have been associated with the major deformation, metamorphic and magmatic event at ca. 1600-1575 Ma that affected much of eastern Proterozoic Australia. Wide spread K-Fe (biotite-magnetite) alteration is genetically linked with the main pyrite ±chalcopyrite mineralising event within the Doora Member of the Wandearah Formation. Zones of high mineralisation were seen to correspond with coarsening grainsize of biotite in petrological and hand sample and were supported by geochemical trends between Fe_2O_3, S and Cu. Later stage hematite bearing phase of alteration resulted in intense alteration and pyrite-chalcopyrite mineralisation locally within carbonate bearing zones. It is suggested that uranium enrichment is also associated with biotite-magnetite alteration but was later stripped from the highly mineralised zones by less pervasive hydrothermal fluids.
U-Pb isotope analysis of zircon grains constrain the age of formation of the basement in which mineralisation occurs. The Moonta Porphyry revealed an age of 1752 ±6Ma. Based on its interdigitising relationship with the Moonta Porphyry a maximum age of sedimentation of the Doora Member is proposed at ca. 1752 Ma. The protolithic material of the Harlequin stone was determined to be similar to that of the Doora Member and was sourced mainly from the ca. 1850 Ma Donington Suite Granitoids. A Pb^{207}/Pb^{206} age of ca. 1708 Ma suggests a wider age of formation of the Wallaroo Group than previously reported in literature.
Alteration within the Oorlano Metasomatite metasedimentary samples showed a clear deviation in chemical characteristics from the Doora Member suggesting different styles of alteration in relation to their proximity to the Arthurton and Tickera Granites.

KEYWORDS

K-Fe metasomatism, IOCG(U), Harlequin Stone, Gawler Craton, Proterozoic, magmatism

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