

Characteristic of Uranium minerals and mineralization in Danfeng Ore-Fields

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Danfeng area was the most important pegmatite-type uranium ore-fields in China. Microscope, SEM & EPMA had been employed to study the characteristic of occurrence, paragenetic association, and hydrothermal alteration of the uranium minerals.

The studied results indicated that uranium mainly existed as independent uranium minerals (uraninite, coffinite, uranophane), few existed by isomorphism distributed in thorite, zircon, xenotime, rutile and other minerals. Uraninite was the only primary uranium mineral, displayed in automorphic & hypautomorphic granular texture and disseminated embedded in quartz, potash feldspar, plagioclase and other gangue minerals or among their grains, and closely paragenetic association with accessory minerals, such as zircon, monazite, and xenotime. The contents of UO_2 , ThO_2 and PbO in uraninite varied respectively between 82.39~89.40wt%, 2.02~3.08wt% and 3.92~4.08wt%, the U/Th ratio of uraninite varied in 27.69-41.91, was less than 100, which might suggest that the uraninite in the studied deposit was magmatic genetic, similar to the studied of Frimmel et al^[1]. Some uraninite was surrounded by secondary minerals which included secondary uranium minerals, sulfide, oxides and other silicate minerals. The detected secondary uranium minerals included coffinite & uranophane. Sulfide was mainly pyrite, a few of chalcopyrite, molybdenite and galena been detected also. Oxides were hematite and magnetite. Secondary silicate minerals included chlorite, hydromica and other clay minerals.

The uranium mineralization of Danfeng uranium ore-field was mainly controlled by crystallization differentiation of primary magma. Later hydrothermal alteration and supergenetic oxidation had influence on uraninite and silicate minerals which resulted in the altered chlorite and pyrite aureoles of uraninite and the formation of secondary coffinite and uranophane.

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[1] Frimmel H.E, et al(2014). Applied Geochemistry, 48:104-121.