

Study of a Series of Ta-minerals in Dajishan W-Nb-Ta Deposit, South China

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A series of Ta-minerals are found in the Dajishan deposit, which is a well-known large-scale polymetallic W-Nb-Ta deposit in south China. Seven Ta-minerals are studied under EPMA and can be classified into two groups as follows:

Group A: disseminated in the granite with single grain shapes and Ta>Nb, classified into the 5 types. The first three minerals contain varying W, but the last two contain no W.

I-type: They occur as discrete euhedral tabular crystal or packed in spessartine as inclusion, belong to primary origin. Chemically, they contain lower WO₃ and FeO, with 0.98 to 2.29wt% WO₃, 1.45 to 2.49 wt % FeO., and enriched in Ta(Nb) with 33.33 to 42.78 wt % Ta₂O₅, 34 to 41 wt % Nb₂O₅; Mn>Fe, with 16 to 18.97 wt%MnO.

II-type: They show similar occurrences to the Type I and the same origin as Type I. But they have higher WO₃, with 40.73 to 52.44wt% WO₃, and with 14.48 to 22.07 wt % Ta₂O₅, with 5.83 to 8.38 wt%Nb₂O₅; Mn≈Fe, with 8.38 to 11.99 wt%MnO, with 11.08 to 13.45 wt%FeO. In addition, the composition vary largely in one crystal

III-type: They occur as discrete tabular crystal, but with many holes. Therefore, they might formed by replacement of the above two types. Their composition vary largely, with 17 to 31 wt % WO₃, 26.78 to 40.43wt% Ta₂O₅ and 17.9 to 25.93wt%Nb₂O₅. Mn>Fe≈2:1, with 10.75~13.88 wt%MnO and 6.65~6.22 wt%FeO.

IV-type: It is a Ta-mineral microlite(U), with 63.44wt% Ta₂O₅, 6.19wt%Nb₂O₅ and 13.49 wt%CaO.

V-type: It is another Ta-mineral euxenite(U), with 33.22wt% Ta₂O₅, 14.26wt % Nb₂O₅, 11.87 wt % TiO₂ and 7.27 wt% SiO₂.

Group B: occur in the tungsten-bearing quartz veins with aggregate shapes and Nb>Ta. Two minerals are identified in the aggregates: W-rich manganocolumbite and wolframioxiolite described as VI-type and VII-type.

These two minerals are intimately intergrown with each other. The W-rich manganocolumbite contains 1.42 to 4.81 wt% WO₃, 58.06~65.60wt%Nb₂O₅, 11.06~15.97wt% Ta₂O₅ and Mn>Fe≈ 2:1. We consider that they formed by replacement of wolframite of early stage by the Ta(Nb)-rich ore-forming fluid of late stages.