

Evidences of rare metals (Nb-Ta) mineralization in pegmatites from Mangodara district (South-West, Burkina Faso)

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Mangodara district (southwest of Burkina) is one of known occurrences of eventual rare metals mineralization in pegmatites in the West African Craton (WAC). It is situated in the tonalite-trondhjemite-granodiorite (TTG) domain of Sidéradougou-Dabakala, between the Banfora Greenstone Belt and the Houndé Greenstone Belt.

Geological mapping works revealed the following lithologies: a biotite foliated granodiorite; a biotite and magnetite foliated, banded and intrusive leucogranite; a biotite granite with porphyroid and banded facies; a gabbro-amphibolite which forms with small metasediments series, isolated and infrakilometric septa and corridors consistent with the regional foliation. Locally, country rocks are affected by partial melting, resulting in the occurrence of garnets gneiss isolated bodies.

Pegmatites occur as metric wide bulging dykes in the leucogranite (K-feldspar, albite, plagioclase, more or less biotite and rare apatite) or as larger dykes until 15 m wide in the granodiorite (muscovite-garnet type). This second type is mainly composed of K-feldspar, albite, plagioclase, quartz, muscovite, biotite, tourmaline, apatite and spessartite-almandine garnets. Zircon, monazite, xenotime, columbite and Zr, U-Th-REE species (thorite, pyrochlore, rhabdophane) are the accessory minerals. These pegmatites show a regional zonation of tourmaline, apatite, and muscovite relatively to biotite.

The origin of the melt that has crystallized in pegmatites is yet undefined. Even if we notice a physical proximity of pegmatites with anatectic facies (apatite-bearing leucosomes in granodiorite, and garnet-gneiss occurrences), the absence of a vast metasedimentary domain, and the geological context dominated by granitoid formations are not easily compatible with a direct anatectic origin. The lack of knowledge on geochemical profile of the leucogranite does not allow to establish a link with the probable mineralization of niobium. The comprehension of the setting up of these pegmatites will need an investigation on the geochemical nature of the different pegmatitic, granitic, amphibolitic and gneissic facies. More generally, it brings us to the question of the origin of TTG-gneiss of the WAC.

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