

Nkob Talc deposit (Siroua inlier, central Anti-Atlas, Morocco): Litho-structural and petrographic characterizations

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The Nkob Talc deposit, situated in the central Anti-Atlas (Morocco), is hosted by the Tonian Taghdout group. This latter corresponds to the break-up and rifting of the northern margin of the West African Craton (WAC) which led to the formation of a passive margin sequence. Rifting culminated with the creation of an oceanic crust between the northern edge of the WAC in the south, and an unknown terrane in the north (Ennih *et al.*, 2001, Thomas *et al.*, 2004). The Nkob massif consists of an allochthonous ophiolite sequence witness of the oceanic crust (El Boukhari, 1991).

The data collected during the various field missions, compiled to the existing data, allow us to realize a detailed geological map of the study area, and to define the various facies in contact with the talc deposit. Within the deposit, there is an alternation of discontinuous, decametric to metric beds of dolomites recrystallized into marble (blackish to greenish rock, with fine grains and heteroblastic texture, dominated by dolomite and calcite) and white talc, chloritite beds and mafic doleritic lavas. Towards the west of the talc deposit, the serpentine concentration is very high (Chrysotile).

The structural study of the area shows that the formations have an average orientation of ENE-WSW, and are affected by an apparent schistosity averagely oriented N100, moderately or strongly deeping towards the north. All these formations are associated to a NW-SE, NE-SW, and E-W faults system.

The rocks in the study area were affected by a regional metamorphism that is characterized by mineral assemblages: “quartz, biotite, muscovite, sericite and ilmenite” in the pelitic rocks; “serpentine + talc + chlorite” in the carbonated rocks; “hornblende, plagioclase, ±epidote, ± opaques” in the mafic rocks. These paragenesis indicate greenschist to amphibolite facies conditions. The analysis of the blastesis-deformation relationship shows that the micas, the andalusites and the cordierites are syn- and late-kinematic. The thermo-barometry conditions were estimated between 450 and 500°C and 4 to 5 kbar which increase towards the west of the study area, reaching a temperature higher than 650°C (El Boukhari, 1991). The regional metamorphism is followed by a contact metamorphism related to the emplacement of the Amassine granite. It is characterized by mineral assemblages “biotite + muscovite + cordierite + andalusites” in the metapelites and "serpentine + talc + chlorite" in the carbonated rocks. Talc are spatially and microscopically associated with carbonate rocks. Talc-carbonate rocks consist of an assemblage “talc ± dolomite ± serpentine ± calcite”. The hydrothermally altered dolomites are successively transformed into serpentine and talc, with late calcite veins that clearly cross the carbonated/serpentinized rocks.

Field relations and assemblage minerals in the talc deposit of Nkob allow us to propose a magnesian sedimentary origin of the parent rock, dolomites, that have been transformed into marble, talc and serpentine during the contact metamorphism and hydrothermalism related to the Amassine granite emplacement. The transformation of dolomites into talc minerals was carried out by the addition of silica from granite and magnesium from dolomites. The geochemical analyses, which are in progress, will allow confirming the sedimentary origin of talc genesis.

References

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