

## **Evidence for Nb-Ta occurrences in the syn-tectonic Pan-African Mayo Salah leucogranite (Northern Cameroon): Constraints from Nb-Ta oxide mineralogy, geochemistry and U–Pb LA-ICP-MS geochronology on columbite and monazite**

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The Mayo Salah pluton, located in the North-Cameroon domain (NCD) of Central African Bold Belt (CAFB) displays features of Rare-metal Granite (RMG). It is made of (1) the metaluminous barren muscovite granite and (2) the Nb-Ta bearing peraluminous leucogranite (MsL). The MsL is subalkaline, slightly peraluminous ( $ASI=1.01-1.21$ ), and displays flat REE chondrite-normalized patterns with a strong negative Eu anomaly ( $Eu/Eu^*=0.02-0.20$ ). It belongs to the peraluminous low phosphorus RMG and L-type igneous rocks as shown by the relatively low Zr/Hf (4.82-13.85) and Nb-Ta (1.43-9.01) ratios and the positive slope of the Zr-Hf-Nb-Ta profile in spider diagrams. The rare-element-bearing mineral are represented by columbite-group mineral (CGM) and other Nb-Ta-oxides. The CGM is classified as Mn-columbite, with Ta# and Mn# ratios increasing from core to rim. The earlier stage of mineralization is related to magmatic fractionation and the later stage is related to hydrothermal episode. The U-Pb dating of columbite and monazite of the MsL indicates a late-Neoproterozoic magmatic-hydrothermal mineralization event from  $603.2\pm 5.3$  to  $581.6\pm 7.2$  Ma consistent with both a late D<sub>2</sub> to D<sub>3</sub> events recorded in the CAFB in Cameroon, and the associated continental collision environment. The Nb-Ta mineralisation of the Mayo Salah pluton provides evidence for the presence of RMG in NCD of CAFB, and its temporal association with the younger period of metallogenic epoch of Nb-Ta-ore formation in Africa termed Pan-African.