

**REE and Nb mineralization in  
carbonatites and their associated  
silica/Fe-oxides of the Ouled Dlim  
Massif in the Reguibat Shield (South  
Morocco)**

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Several carbonatite bodies were recently discovered in the Ouled Dlim massif (South Morocco), two of which (the Paleoproterozoic Gleibat Lafhouda magnesio-carbonatite and the Cretaceous Twihinat calcio-carbonatite) are known to be associated with important REE and Nb deposits, mainly linked to associated Fe-oxides and silica breccia.

The Gleibat Lafhouda carbonatites are intruded by Iron-Oxide-Apatite (IOA)-type mineralization and are hosted by Archean orthogneis. The REE mineralization is represented by low-Th monazite-(Ce) which mainly occurs as inclusions or as separate phase in the vicinity of apatite, indicating a hydrothermal origin. The Nb mineralization is represented by columbite-(Fe) which occurs closely associated with magnetite and hematite. Although the outcropping carbonatite is barren, drill cores have shown REE mineralization at depth. Metasomatized micaceous rocks occur locally at the margin of the carbonatite outcrop and were identified as glimmerite fenite type.

The Twihinat deposits occur in both carbonatite and the associated silica/Fe-oxides, which form an annular structure of ca 3 km diameter, that is hosted by early Cambrian gneis. The main REE and Nb minerals show secondary ore formation in the form of bastnaesite, pyrochlore and cerio-pyrochlore, suggesting the influence of late mineralizing fluids.

These preliminary results clearly show that the two studied deposits are economically highly important and may deserve a world-class status.