THE OCCURRENCE AND NATURE OF ALLANITE AND ASSOCIATED Y, REE, (TH)-BEARING MINERALS IN THE GRANITIC ROCKS, EASTERN DESERT, EGYPT.

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Allanite, $(Ca,Ln)_2(Al,Fe,Mg)_3Si_3O_{12}(OH)$, is present as an accessory mineral in granites, monzonites, syenites and their volcanic equivalents as well as in granulites, schists and pegmatites, in skarns and hornfels, etc. In the Eastern Desert of Egypt some occurrences of allanite in Precambrian pegmatite dikes have been described in detail by GINDY (1961). We report the allanite occurrence in hydrothermally altered granitic rocks, locally traversed by lamprophyres, from Wadi Umm Selalieb, Bir El Sayala region (33°57'E; 26°04'N).

Typically, allanite forms very small, microscopic, sub/euhedral crystals, twinned and zoned, rimmed by ferriferous epidote and clinozoizite. Allanite grains are altered to some extent or completely into an yellow-brownish-rusty material, mainly bastnaesite and other REE fluorocarbonates, and subordinate iron oxides and clay-like phases. The rims and some interme-diate zones of allanite are partially transformed to a metamict phase. The destruction of the crystalline structure is considered due to the bombardment by alpha particles, and is obviously controlled by the concentric zonal structure of allanite. The mineral preserves fresh, unchanged domains in the core along with isotropized and leached rim zones displaying no pleochroism and birefringence.

Subsequent hydrothermal alteration of allanite is evidenced by the formation of bastnaesite, yttrocerite and other Y, REE fluorocarbonate minerals, that along with fluorite, apatite, alumina and iron oxides are present as pseudomorphs. This observation reflects the grain chemical heterogeneity with large deviations of the altered zones from the original composition. Chemical data indicate the loss of Fe, Mg, Ca, Al and Si, and the enrichment in REE, Y, Th along with reversed ratios of the REE (Ce/La; Ce/Y), from core to rim.

The occurrence and spatial distribution of various secondary minerals such as albite, epidote, clinozoizite, chlorite, apatite, calcite, fluorite, sphene and (Y, REE)-minerals indicate the pathway for fluid circulation causing leaching and removal of chemical constituents during a low temperature hydrothermal stage.

GINDY, A.R. (1961): Allanite from Wadi El Gemal area, Eastern Desert of Egypt, and its radioactivity. - American Mineralogist, 46, 985-993.