Petrochemistry of the Melilite-Bearing Uncompahgrite and Turjaite Rock Types from South Rangwe Complex, Western Kenya

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The uncompahgrite turjaite complex constitutes a part of the larger Rangwe caldera which occurs in the Tertiary and Quaternary alkaline province, south Nyanza district, western Kenya. Uncompahgrite and turjaite are strongly metasomatised rocks in which the earliest minerals (forsterite, diopside, magnetite, perosvikite) are more or less replaced by melilite, phlogopite, carbonate and other minerals. Melilite is further sericitized.

Melilite is the most abundant mineral in both the uncompahgrite and turjaite. The melilite occurring in the uncompahgrite show a higher akermanite content than melilite in the turjaite. By contrast, the melilite in the turjaite show a higher sodium content. The turjaite differs from the uncompahgrite by containing nepheline, more phlogopite and apatite, and less diopside. Forsteric olivine (Fo85) distinctly occur only in the uncompahgrite rock.

The geochemical studies show that the turjaite is enriched in total alkalis, Al2 O3 and P2 O5, but depleted in CaO, TiO2, and FeO relative to the uncompahgrite. The characteristic light REE enrichment in the rock sequences is in the order : ijolite < turjaite < uncompahgrite. The element distribution patterns within the rock types indicate a close genetic
association between the uncompahgrite and turjaite.

Microprobe analyses of the garnet crystals in both the uncompahgrite and turjaite show a strong andraditic affinity with possible melanite and schorlomite varieties. The ore minerals identified in the turjaite include pyrite, chalcopyrite, and magnetite.

Key words: Petrochemistry, Uncomphagrite, Turjaite, melilite, Rangwe caldera, western Kenya.