Ain Shams University
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Assessment of Egyptian Talc-Carbonate Rocks in the Central Eastern Desert for Some Industrial Applications

By

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ABSTRACT

Enormous quantities of practically untapped talc-magnesite rocks are distributed in the Barramiya and Wadi Atalla districts in intimate spatial and genetic association with the ophiolitic serpentinites. These deposits are an important potential source of magnesia, which is used in a broad spectrum of strategic industries. The ophiolitic serpentinites represent obducted oceanic slices onto island-arc successions. The talc-magnesite deposits are located: a) along major faults that cut the serpentinite slices, or b) at thrust contacts between obducted serpentinites and other country rocks of island-arc affinity. The latter were regionally metamorphosed at greenschist up to middle amphibolite facies conditions. The talc-magnesite rocks represent in situ fissure-fed metasomatic products of serpentinite precursors via extensive rock-fluid interactions. The main fluids involved in the transformation processes were SiO_2 aqueous solutions and CO_2. The deposits located along the fault systems cutting the serpentinite-host are magnesite-rich, whereas those located at the contacts between serpentinites and the more siliceous country rocks are typically talc-rich. Based on the proportional distribution of talc and magnesite in conjunction with other accessories, the rocks have been distinguished into assemblages. Their characteristics, petrogenesis and evolution from serpentinite precursors are elaborated in the light of their petrography, XRD, EDAX and XRF data. Constraints on the conditions of their formation include temperature of about 490°C and a maximum XCO_2 of about 0.13. New mapping was undertaken for both Barramiya and Wadi Atalla districts using remote sensing and GIS techniques. The talc-carbonate rocks of both areas were mapped as separate layers and their reserve estimations were accomplished. Representative talc-carbonate samples were used in the production of refractory shaped cordierite ceramics. The latter is recommended as kiln furniture and car-top lining for the tunnel-kilns used in firing clay building bricks up to 1000 - 1100^{o}C as a maximum service temperature.

Key words: Talc-carbonates, Ophiolits, Serpentinites, Barramiya, Wadi Atalla, Petrogenesis, Cordierite, Refractory Ceramics.

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