Mineral assemblages and the origin of ruby in the Mogok Stone Tract, Myanmar

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The Mogok Stone Tract of Myanmar (Burma) is legendary for the finest rubies and spinels, however, the geology of the marble hosted assemblages is complex. In particular, the rubies have been ascribed to metamorphism of aluminous sediments, but Iyer (1953) argued that the association with pneumatolytic veins emanating from intrusives was critical. In spite of difficulties in gaining access to mines and samples, some progress has been made recently in understanding the characteristics and origins of the gem minerals from the Tract.

Mineral assemblages involving corundum have been studied utilizing collections at AMNH (~ 300 specimens) and those of the Myanma authors. The hosting Mogok Belt of marbles and schists was formed from Proterozoic sediments (>750 MYa) metamorphosed and intruded by syenitic to granitic magmas during collision with a Gondwana fragment (Burma Block) in Cretaceous time (~150 MYa) and later with the Indian block commencing in Eocene time (~50 MYa) with metamorphism to ~20 Ma and intrusions to ~15 Ma. The complex geological record helps explain the diverse mineral assemblages.

Ruby-hosted in marble is documented from 10+ mines in the AMNH collection with another ~20 locations in Myanma collections. Ruby + calcite + graphite ± muscovite ± pyrite is the most common assemblage, but colorless minerals adjacent to ruby may have been overlooked. Dattaw produces ruby in marble with conspicuous blue cancrinite/davyne and less obvious scapolite (intermediate meionite–marialite) + colorless sodalite ± nepheline as well as phlogopite ± spinel ± pargasite ± tourmaline. Similar assemblages with scapolite, sodalite, nepheline, datolite or moonstone are found at Kolan, Lay Oo, Ongaing, Pyant Gyi, Sakan Gyi, and the sources between Kabaing and Sinkwa: Wet Loo, Kyakpyatthart, Thurein Taung, etc. The silicates are typical of skarns and argue for interaction between magmas (or their fluids) and marble. The fact that rubies are surrounded or connected to skarn-silicate veins may indicate ruby crystallization is affected or even produced by the skarn reactions.

Recent work on painite ($CaZrBAl_9O_{18}$; Rossman et al., 2005, website) from the Kabaing–

Sinkwa area mines suggests growth during a skarn forming event between leucogranite and marble. Minerals with painite include scapolite, tourmaline, and margarite and support this interpretation. A conspicuous textural feature of these specimens is ruby crystallized on painite, demonstrating corundum growth during skarn formation.

Magmatic interactions with the Mogok Belt rocks appear to play a role in the crystallization of at least some ruby from the Mogok Tract.

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Poster

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