

Mineralogical studies of the gemstones-bearing pegmatites of the Shigar valley, Skardu, Gilgit-Baltistan, Pakistan

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Shigar valley, located north of Skardu, is one of the most famous valleys of the Gilgit-Baltistan region of Pakistan as it is the gateway for most of the expeditions to the K-2, the second highest peak of the world. In recent years, this valley attained greater importance in regard to the gemstone occurrences. These are world class gemstones, mainly hosted by the pegmatites, which have attracted a large number of international gems dealers to this region for several years.

The pegmatites are well exposed in most parts of the northern areas of Pakistan. These occur mainly within amphibolite to granulite facies schists and gneisses. The amphibolites hosted pegmatites in the region extend from Hunza River in the northwest to Shigar River near Dassu in the southeast. Besides these, the pegmatites are also present at Garam Chashma in the western Karakoram and the Hushe and Masherbrum regions of the Karakoram metamorphic complex. The granitic-pegmatites are also exposed in the Indo-Pakistan continental plate in the Nanga Parbat-Haramosh Massif at Dache, Khaltaro, Shegus and Stak Nala. The pegmatites of different ages are also reported within the Kohistan batholith.

There are plenty of pegmatites exposed in the Shigar valley that host a variety of gemstones. Field and mineralogical studies of the Shigar valley pegmatites and hosted gemstones have been conducted to identify the processes involved in the formation of gemstones. On the basis of field features and internal structure, the pegmatites have been broadly classified into simple and complex or zoned pegmatites. Petrographically, these have further been classified into four types/classes, depending upon the presence or absence of different accessory minerals and gemstones. The occurrence of gemstones is generally restricted to the zoned pegmatites. The gemstones have been confirmed as topaz, aquamarine, tourmaline (schorl-foitite), goshenite, garnet (almandine-spessartine), epidote (zoisite-clinozoisite), quartz and fluorite by using various instrumental techniques such as X-ray diffractometer, electron probe micro-analyzer and scanning electron microscope. Magmatic hydrothermal processes are mainly responsible for the formation of gemstones in these pegmatites. However, at places certain gemstones have metamorphic-metsomatic origin.