American Mineralogist, Volume 105, pages 1436–1440, 2020

Letter

Inherited Eocene magmatic tourmaline captured by the Miocene Himalayan leucogranites

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Abstract

The Miocene Cuonadong leucogranites in the easternmost section of the Tethyan Himalaya, Southern Tibet, are characterized by two types of tourmaline. Tourmaline occurs as needle-like crystals in the two-mica ± tourmaline granites (Tur G) and large patches in the pegmatites (Tur P). Both the granite and the pegmatites yield Miocene ages (ca. 20 Ma) based on monazite U(-Th)-Pb dating, whereas $^{40}Ar/^{39}Ar$ geochronology of the coarse-grained tourmalines (Tur P) crosscut by pegmatite veins yielded an Eocene mini-plateau age of 43 ± 6 Ma. Major element concentrations of tourmaline indicate that both Tur P and Tur G belong to the schorl group with a magmatic origin, but trace elements such as V indicate that they are not cogenetic. Boron isotopes suggest that Tur P (average –9.76‰) was derived from typical crustal sources, whereas Tur G (average –7.65‰) contains relatively more mafic input. The capture of Eocene tourmaline by the Miocene leucogranites at Cuonadong suggests that the crustally derived Eocene magmatism may have occurred in the southern Tethyan Himalaya. Identification of the inherited magmatic tourmaline (Tur P), although not common, challenges the current application of tourmaline chemistry to the investigation of magmatic-hydrothermal systems.

Keywords: Inherited tourmaline, Himalayan leucogranite, $^{40}Ar/^{39}Ar$ and U(-Th)-Pb geochronology, B isotope