TOURMALINES FROM THE STEWART MINE, PALA, SAN DIEGO COUNTY, CALIFORNIA: CHEMISTRY AND CRYSTAL STRUCTURE

The Stewart mine is an extremely rich tourmaline mine located in Pala, California. The Stewart Mine, the Himalaya Mine and the Tourmaline Queen Mine are all known for their gem quality tourmaline samples. A significant body of knowledge and literature exists regarding these tourmaline mines. Published literature and work exists dating back to the late 1970s. We will be comparing the atomic structure and chemistry of the tourmalines from the Stewart Mine to tourmalines found at the Himalaya Mine.

The atomic arrangements of seven tourmaline crystals were determined using a Bruker Apex II single-crystal X-Ray diffractometer with a charge-coupled detector. Concentrations of all of the elements except the light elements H, Li, Be and B were obtained using a CAMECA SX51 electron microprobe (EPMA) equipped with wavelength-dispersive spectrometers located at Universität Heidelberg in Germany. Concentrations of the light elements H, Li, Be and B were obtained using a secondary ion mass spectrometer (SIMS) with a CAMECA ims 3f ion microprobe also located at Universität Heidelberg.

Upon determination of the structure and the chemistry of the seven tourmaline crystal samples from the Stewart Mine, a comparison were made between the structure and chemistry of tourmaline samples from the Stewart Mine and from the Himalaya Mine, and the crystal chemistry of the Stewart Mine tourmaline samples.