

POSSIBLE TEKTITES FROM BELIZE, CENTRAL AMERICA: PETROGRAPHY AND GEOCHEMISTRY

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Introduction: Tektites are a rare type of impact glass; they are found in only four distinct and geographically extended strewn fields, 0.8 to 35 Myr in age. For three of these four strewn fields, the source crater is known. Tektites were derived from the very surface of the target area and may have formed and ejected before the main crater excavation phase even begun (see, e.g., [1,2]). Within the past 20 years, tektite-like glasses have reported from western Belize, possibly indicating a new strewn field in Central America. These glasses were dated by the ⁴⁰Ar-³⁹Ar method, giving total fusion ages of 820±40 ka (2σ) [3], or a plateau age 769±16 ka [4].

Methods: 18 samples of Belize glasses were studied. Petrographic studies were done in Delaware, whereas all geochemical work was performed in Vienna. Major element compositions were measured by electron microprobe, and trace element contents by instrumental neutron activation analysis.

Results: In transmitted light the Belize glass is pale brownish yellow to yellow-brown in color. Darker and lighter colored schlieren occur in 14 out of 18 samples. Vesicles (up to 1.2 mm) range from rare (0.1 vol.%) to common (8.4 vol.%) and are mostly spherical in shape (oval vesicles were observed in only one specimen). Lechatelierite particles are present in each specimen and range from rare (<0.1 vol.%) to common (0.4 vol.%). The lechatelierite particles vary in shape from equant to long and sinuous. Both the vesicles and the lechatelierite particles are more abundant in the darker schlieren and less abundant in the lighter schlieren than in the adjacent glass. Some observed petrographic features appear to be unique to these samples. Some have lechatelierite particles with one or more dark opaque to translucent dark brown regions which may be a melted opaque phase. Also present was a grain with a ballen-like texture in one specimen and a grain with a large centrally located region with an appearance similar to “toasted quartz”. In terms of composition, a typical sample has the follow major element contents: SiO₂: 63.37, Al₂O₃: 16.86, TiO₂: 0.95, FeO: 6.39, MnO: 0.17, MgO: 1.89, CaO: 4.83, Na₂O: 3.12, K₂O: 1.68. These compositions are quite different from those of Australasian tektites (e.g., high Na).

Discussion: The Belize glasses have ages very similar to those of Australasian tektites, leading to suggestions that there might be a relation. Whole specimens have similar appearances as normal splash-form tektites, although there are many irregular forms as well. Compared to Australasian splash form tektites, the Belize samples are more heterogeneous, both in terms of petrography and geochemistry. The major element composition shows much higher intra-sample variations as “normal” tektites. The petrography of the Belize glasses suggests they fell relatively close to the source crater – assuming they are of impact origin. Further analyses, including isotopic studies, are in progress.

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