BERYLLIUM-10 IN AUSTRALASIAN MICROTEKTITES.

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Previously, Australasian tektites have been measured for the concentrations of the cosmogenic radionuclide ^{10}Be, which forms by interaction of cosmic rays with nitrogen and oxygen in the atmosphere and is concentrated in the top of any sediment column. These data help to constrain the location and characteristics of the source material. The ^{10}Be half-life is 1.36 M.y.; thus, it can only be studied in relatively young impact structures and glasses. The average value of ^{10}Be in Australasian tektites is about 100×10^6 atoms/g [1]. This is comparable to ^{10}Be contents of near-surface source materials, e.g., soils or sediments (marine and land). Also, within the Australasian strewn field there is a correlation between the tektite type and the ^{10}Be concentration [1]. Aerodynamically shaped tektites (Australites) found farther from the presumed impact site in southeast Asia have higher contents (on average about 136×10^6 atoms/g) compared to layered (Muong Nong-type) tektites, which have not been transported as far (on average about 59×10^6 atoms/g). This has obvious implications on the formation mechanism of tektites. The Ivory Coast tektites are regular (splash-form) tektites related to the Bosumtwi Crater formed at 1.07 Ma, and if these tektites also formed from surficial materials as did the Australasian tektites, then they are expected to contain similar concentrations of ^{10}Be. Measurements by [2] show that ^{10}Be concentrations of Ivory Coast tektites are consistent with formation from mostly near-surface sediments or soils. Traces of ^{10}Be were also found by [2] in a moldavite (Central European tektite). Thus all tektites in which ^{10}Be can be measured show the presence of that nuclide, indicating that tektites in general are produced from near-surface target rocks.

One open question is if microtektites also contain Be-10, and how much? Due to the small sizes of microtektites, such measurements were difficult to impossible until now. As a first attempt, we selected three microtektites and a fragment from Site 1144A in the South China Sea, three microtektites from V29-39 and two from V29-40 from the Central Indian Ocean, and two from site V16-70 (which is father from the Indochina area). The compositions were measured by microprobe, and afterwards the microtektites were released from the epoxy, cleaned, and pooled, giving a total mass of 620.5 µg. Initially we hoped to measure the three main locations separately but the weight was insufficient. The content of Be-10 was measured by accelerator mass spectrometry at Purdue University. The microtektite composite contains $260 \pm60\times10^6$ atoms ^{10}Be/g. This concentration is notable for at least two reasons: first, this is about two times higher than that for the splash-form (ablated) australites, which otherwise have the highest ^{10}Be content in the strewnfield; second, as this is an average for microtektites recovered at various distances from the inferred source area, some microtektites could contain even higher contents of ^{10}Be. The immediate conclusion is that microtektites are derived from the immediate surface of the target and that the form even before the "normal" tektites.

References: [1] Ma P. et al. 2004. *Geochim. Cosmochim. Acta* 68:3883-3896. [2] Serefiddin F. et al. 2007. *Geochim. Cosmochim. Acta* 71:1574-1582.