TRANSANTARCTIC MOUNTAIN MICROTEKTITES: NEW PETROGRAPHIC DATA, WATER CONTENT, AND Nd AND Sr ISOTOPIC COMPOSITION

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We expand on the characterization of the recently discovered microtektites from the Transantarctic Mountains [1] by providing new petrographic data on newly identified microtektites, as well as the water content and Nd and Sr isotopic composition of a representative set of microtektites.

High magnesium microtektites: Of the 55 sectioned microtektites in the 300-800 μm size range analyzed to date by EMP, 52 are pale-yellow transparent glass spheres with SiO_2 ranging from 64 wt% to 78 wt% and with MgO < 5 wt%. The other 3 microtektites are pale-green transparent glass spheres with a lower SiO_2 content in the 59 to 61 wt% range and a higher MgO content in the 11 to 13 wt% range. The two compositional groups are similar to the normal and high magnesium microtektite types in the Australasian microtektite population [2, 3].

Silica-rich inclusions: In one of the 500-μm-diameter microtektites studied by EMP we found a rounded Si-rich, glassy inclusion 40 μm in diameter. The silica content of the inclusion (SiO_2 = 90 wt%) differs significantly from that of the host particle (SiO_2 = 70 wt%). Almost pure silica glassy inclusions, namely Lechatelierite, have often been reported in microtektites [2, 4]. We interpret the newly identified inclusion as a Lechatelierite-like inclusion which was partly digested during the high temperature regime of the microtektite-forming process.

Water content: The water content of 12 microtektites obtained by means of SIMS analyses ranges from 28 to 206 ppm (avg. 85 ± 58 ppm). The lowest values were observed in the three high-magnesium microtektites (28 - 44 ppm). Transantarctic Mountain microtektites are thus essentially dry, like tektites [5] and unlike volcanic glasses with a similar silica content. There is no literature data on the water content of microtektites in the literature; however, a comparison with the limited literature database [5] for macroscopic tektites from the four known strewn fields (North American, Central European, Ivory Coast and Australasian) reveals that the water content of Transantarctic Mountain microtektites is similar to that of Australasian tektites (40 – 300 ppm).

Sr and Nd isotopic composition: Two multigrain samples (10 microtektites totaling about 2.5 mg) analyzed by means of conventional TIMS gave $^{87}Sr/^{86}Sr$ = 0.71622 ± 1 (2σ) and 0.716372 ± 1 (2σ) and a $^{143}Nd/^{144}Nd$ = 0.51209 (2σ = 3). Their ε_{Sr} = 166 and 169 and their ε_{Nd} = -10.7 clearly fall in the Australasian tektite range [6].

Conclusions: New data strengthens our previous conclusions [1] that Transantarctic Mountain microtektites are indeed microtektites and that they represent the southern extension of the Australasian tektite/microtektite strewn field.

References: [1] Folco L. et al. 2008. *Geology*, 36:291-294 [2] Cassidy W. A. et al. 1969. *JGR* 74:1008-1025. [3] Glass B. P. et al. 2004. *GCA* 68:3971-4006. [4] Koeberl C. et al. 1997. *GCA* 61:1745-1772. [5] Beran A. and Koeberl C. 1997. *MAPS* 32:211-216. [6] Shaw H. F. and Wassenburg G. J. 1982. *EPSL* 60:155-177.

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