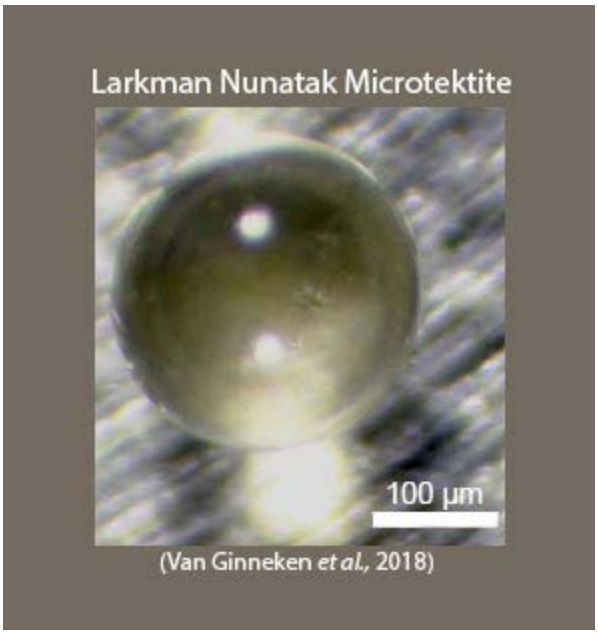
PLANETARY SCIENCE RESEARCH DISCOVERIES
CosmoSparks
Quick Views of Big Advances

Microtektites

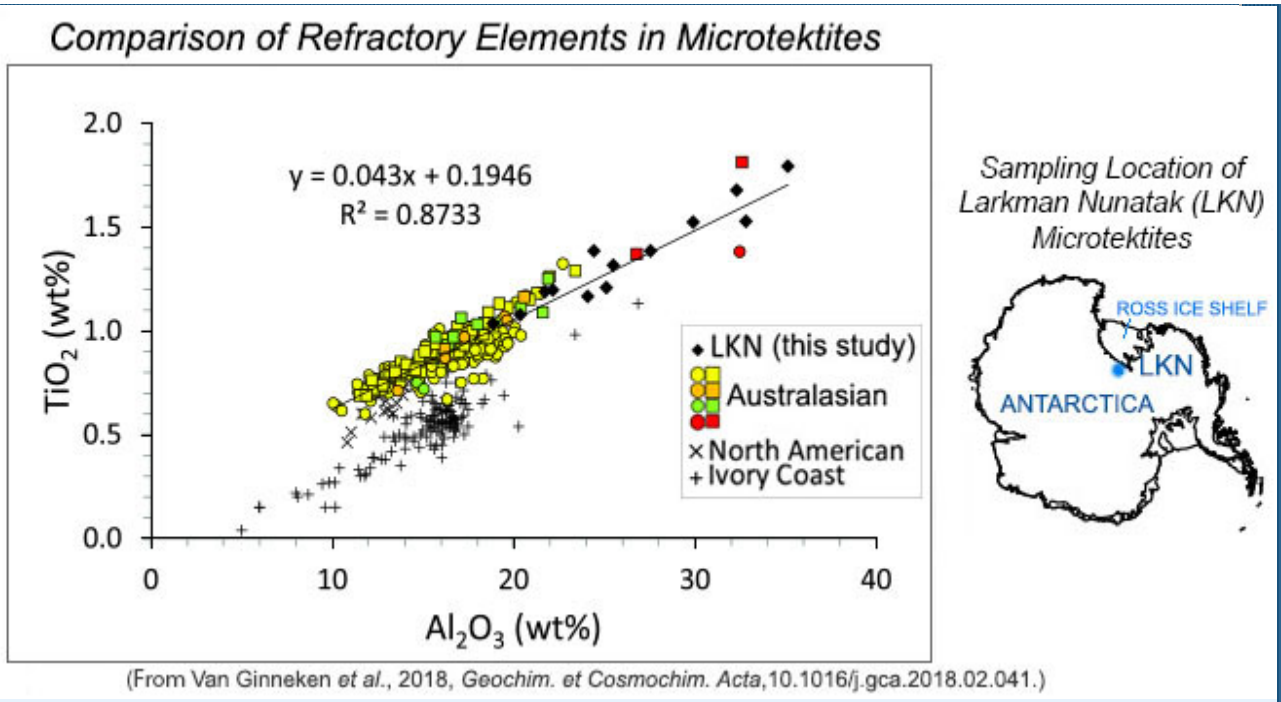


Tektites and the smallest versions called microtektites are glassy spherules of terrestrial crustal material that formed as melted-and-quenched debris from natural, hypervelocity impacts. These small and rare spherules are studied to better understand the chemical effects and physics of large impacts on Earth. And only four major strewn fields of tektites and microtektites have been identified worldwide. Now the largest of the strewn fields has grown even larger since researchers have studied a new, small collection of microtektites (see magnified image) from Antarctica.

Thirteen microtektites collected from a glacial moraine near Larkman Nunatak, Antarctica (marked as LKN blue dot on the inset map) have been analyzed and discovered to be related to the Australasian strewn field. This discovery not only extends the size of the strewn field to a whopping 12,000 kilometers from its hypothetical source crater in Southeast Asia, but also has implications for impact dynamics, mircotektite formation and distribution, and the glacial history of the East Antarctic Ice Sheet.

Matthias Van Ginneken (Imperial College London and The Natural History Museum, London now at Vrije Universiteit Brussel and Université Libre de Bruxelles), Matthew Genge (Imperial College London), and Ralph Harvey (Case Western Reserve University) report major element and trace element compositions of the transparent glass spherules (107–288 µm in diameter) and compared them with previously analyzed microtektites.

The graph, below, shows one example of the team's results, titanium oxide plotted against aluminum oxide measured for the LKN microtektites (black diamond data points). The LKN microtektites plot along the trend of the Australasian microtektites, though are enriched in TiO_2 and Al_2O_3 when compared with most of the Australasian samples (colored circles and squares).



(From Van Ginneken *et al.*, 2018, *Geochim. et Cosmochim. Acta*,10.1016/j.gca.2018.02.041.)

Microtektites collected from a glacial moraine near Larkman Nunatak (LKN) plot along the trend line previously determined for microtektites from the Australasian strewn field. Data from two other microtektite strewn fields are shown for comparison: North American (x) and Ivory Coast (+).

Van Ginneken and coauthors's elemental data show that LKN microtektites extend the trend line (above) toward more refractory compositions. Additionally, their data suggest the LKN microtektites are a new type of highly-vaporized end-members of the Australasian strewn field.

The discovery of these microtektites, and others recovered previously from sites along the Transantarctic Mountains, supports the idea of a stable East Antarctic Ice Sheet over the last ~1 million years. This idea is consistent with the decades of successful recovery of tens of thousands of ***meteorites*** from bare-ice ***stranding surfaces*** along the Transantarctic Mountains.

See Reference:

· Van Ginneken, M., Genge, M. J., and Harvey, R. P. (2018) A New Type of Highly-vaporized Microtektite from the Transantarctic Mountains, *Geochimica et Cosmochimica Acta,* v. 228, p. 81-94, doi: 10.1016/j.icarus.2017.08.019. [***abstract***]

See also:

· ***ANSMET***, The Antarctic Search for Meteorites.

· ***ANSMET 2017-2018 Field Season in the Icefields Surrounding Grosvenor Mountains and Headwaters of Amundsen Glacier, Antarctica***, **PSRD** Cosmo*Sparks* Report.

· Folco, L., D'Orazio, M., Gemelli, M., and Rochette, P. (2016) Stretching Out the Australasian Microtektite Strewn Field in Victoria Land Transantarctic Mountains, *Polar Science,* v. 10(2), p. 147-159, doi: 10.1016/j.polar.2016.02.004. [***abstract***.]

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