MICROTEKTITE HUNTING AND MINERAL WOOL SHOT  D. Storzer, Laboratoire de Minéralogie, Muséum National d'Histoire Naturelle, 61, rue Buffon 75005 Paris, France.

There is increasing evidence that global catastrophes on earth due to large meteorite or comet impacts might have occurred as multiple events closely spaced in time. The event responsible for the Australian tektite strewnfield (= 850 Ka ) is about 150 Ka older than the impact which made the South East Asian strewnfield (1). The Bosumtwi impact crater with its Ivory Coast tektite strewnfield (1.05 ± 0.11 Ma) and the Zhamanshin impact crater (1.08 ± 0.06 Ma) might be separated in time by up to 200 Ka (2). Late Eocene clinopyroxene-bearing glass spherules from deep marine sediment cores occur in a separate layer about 25 cm below the normal microtektites which are related to the North American tektite strewnfield (= 35 Ma) (3). Mass extinctions of biota are generally episodic of accelerated loss of taxa occurring stepwise over a laps of time. Because of this, multiple impacts of large meteorites during a relatively short time span could provide an elegant explanation for mass extinctions (if there is any correlation between both phenomenon at all). There has been significant recent discussion on the relationship between late Eocene episodes of mass extinction and the number of coeval microtektite layers. For the nearly global dispersion of microtektites two impacts (3, 4), three (5, 6) and more (7) were proposed. Obviously fueled by the need to increase the number of late Eocene impact events, glassy microspheres from Cynthia, Mississippi (8) and Molino de Cobo, Spain (5, 6) were reported as microtektites. The Cynthia spherules were recently identified as modern contaminants from a nearby manufacturer of light aggregate (9). Regarding the discussion on the Molino de Cobo spherules I report in the following on my own experience in microtektite hunting.

In 1986 numerous glassy microparticles were discovered in a drill core from Gabon with typical tektite-like aerodynamic shapes (spheres, dumbbells, teardrops) and lustrous surfaces. They range in color from pale yellow to pale yellow-brown, in size from 0.1 mm up to one mm. The K-Ar age of these glasses exceeds significantly their stratigraphic age of late Cretaceous (F. Walgenwitz, personal communication 1986). Twenty glass spherules were, therefore, subjected to fission track dating. Not one single fossil fission track was found on about 9 mm² of scanned glass surface. Together with a mean uranium content of 14.5 ppm (range : 12.8-15.9 ppm), this result leads to a fission track age of t ≤ 10 Ka. This fission track age of virtually zero for the Gabon microspherules is strong evidence that they are in fact modern contaminants, an origin likewise endorsed by their chemical composition (see Fig.) which is near the composition of iron blast-furnace slag or mineral wool shot. Already in 1970 we had, together with B. Kleinmann, investigated similar tektite-like glassy microspheres which had been collected allegedly from Cretaceous strata in Switzerland. Because of their chemical composition, totally dissimilar to tektite glass, and their fission track age of virtually zero, they were diagnosed as modern artifacts; the data were afterwards nearly forgotten in a drawer. The Swiss and the Spanish (Molino de Cobo) glassy spherules are remarkably similar in their chemical composition. They range from 22-61 % resp. 25-53 % SiO2 and show no clear compositional trends. Compared to late Eocene microtektites (6) and the Cretaceous / Tertiary boundary glasses at Beloc, Haïti (10), most of them are Al-rich and Ca-poor (see Fig.). In a similar manner, both are generally poor in Mg, Na and enriched in K, Fe, Ti. It is, therefore, suggested that the glassy microspheres from Spain like those from Switzerland have a common origin; both are surface contaminants of modern industrial origin. Regarding the provenance of these contaminants, the most plausible source seems to be mineral wool, a favourite and omnipresent material for acoustic tiles and thermal insulations. Mineral wool shot, admixed to the fibres, consist chiefly of almost spherical particles, dumbbells and teardrops typically 0.1 to 0.8 mm in size (11). It is evident that the chemical composition of such microspheres might be highly variable according to the nature of the raw material used in the melting process by different manufacturers.
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In conclusion, the above examples demonstrate unambiguously the problem of surface contamination by glassy microspherules of modern industrial origin, especially by mineral wool shot omnipresent at habitations, storerooms, and laboratories. The in situ nature of microspherule glasses is easily verifiable by fission track dating. It is interesting to note that the K-Ar clock might not be reset quantitatively during the process of industrial spherule production. It is stressed that the term tektite or microtektite is not restricted to a morphological meaning but has a genetic notion. Aerodynamically shaped glass spherules are not by necessity of impact origin but may be produced by a variety of industrial and natural (e.g., lightning, volcanic eruption) processes. Even a simple cigarette lighter makes microspherules.


Oxide variation diagrams showing CaO and Al2O3 plotted against SiO2 for various glassy microspherules of modern industrial origin. Gabon spherules: diamonds; and iron blast-furnace slag: large open circle (analyses from B.P. Glass, written communication 1986); mineral wool shot: large open square (11); Cynthia spherules: full circles (9); Swiss spherules: small squares (unpublished analyses, B. Kleinmann 1970); Molino de Cobo spherules: stars (6). For comparison the data for late Eocene North American microtektites: open field (6) and the tektite-like glasses from the K/T boundary at Beloc: light shaded field (10) are also given.