**MINERALOGY OF THE K/T BOUNDARY IN A DEEP-SEA CORE: DSDP 596.**

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The geochemistry and shocked quartz distribution at the Cretaceous/Tertiary (K/T) boundary in DSDP Site 596 (western South Pacific) is described by Zhou et al. (1). Some interesting mineralogical features of this boundary section were not described in detail in that publication and we will discuss them here.

**Shocked quartz** - more than 50% of the total quartz grains recovered show evidence of shock by the presence of planar deformation features (PDF). A quartz grain showing clear evidence of shock metamorphism, as revealed by multiple sets of PDF, is shown in Fig. 1. However, in most of the quartz grains this evidence is not as clearly revealed because of extensive overgrowth. This amount of overgrowth had not been noticed in other K/T boundary samples previously although it may have been present to varying degrees, resulting in lower estimates of shocked grain percentages. Overgrowth modifies the surface expression of the PDF in SEM photos, resulting in discontinuous lamellae with rounded terminations (Fig. 2). That the PDF are preserved at all is due to the inability of quartz overgrowth to nucleate on the glass-filled lamellae. If the overgrowth is thick enough, the authigenic crystals grow together over the PDF lamellae, sealing these features under a continuous layer of secondary quartz. However, the PDF can still be clearly seen optically through the transparent overgrowth in oil-immersion mounts. A few of the quartz grains show very high levels of shock, as evidenced by numerous PDF and the resulting fragile nature of the grain (Fig. 3). These highly shocked grains may have been broken up in previous investigations where more aggressive preparatory techniques had to be used; thus, the maximum level of shock recorded by quartz grains in K/T ejecta probably has been underestimated.

**Other nonopaque minerals** - a suite of trace minerals similar to those recovered from other K/T sites (2) was observed in these samples. Both K-spar (rare) and Ca-rich plagioclase (common) are present; a few of the K-spar grains show PDF due to shock (Fig. 4), but none of the plagioclase grains display PDF.

**Magnesioferrite** - this impact-generated spinel mineral is rather abundant in these samples and occurs as octahedra (Fig. 5), dendrites, and cores of spherules (Fig. 6). The crystals are often larger (<40 um) than noted at previously examined sites (3), particularly the Western Interior nonmarine sites (4). The unusually large size of these vapor condensate crystals suggests that they have experienced a longer residence time in the vapor cloud and thus indicates a greater distance from the impact crater for this site. This distance indication corroborates data for the maximum size of shocked quartz grains measured at this site (0.12 mm), which is similar to the value from New Zealand (0.11 mm). Both of these values are smaller than have been measured at K/T sites elsewhere in the world (5), suggesting that the DSDP 596 and New Zealand sites are farthest from the point of impact.

**REFERENCES:** (1) Zhou, L., Kyte, F.T., and Bohor, B.F. (1991) Geology (submitted); (2) Bohor, B.F. et al. (1989) Meteoritics **24**, p. 253; (3) Bohor, B.F. et al. (1987) Earth Planet. Sci. Lett. **81**, 57-66; (4) Bohor, B.F. and Foord, E.E. (1987) LPSC XVIII, 101-102; (5) Bohor, B.F. (1990) Tectonophysics **171**, 359-372.

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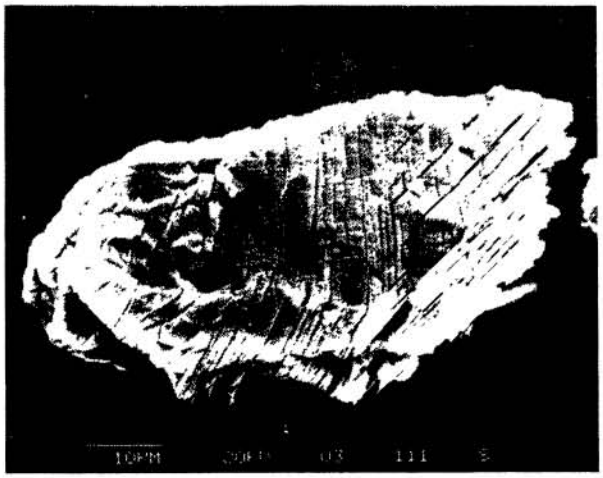

Fig. 1. Shocked quartz grain with two strong sets of planar features (PDF)

Fig. 2. Overgrown shocked quartz. Note discontinuous lamellae.

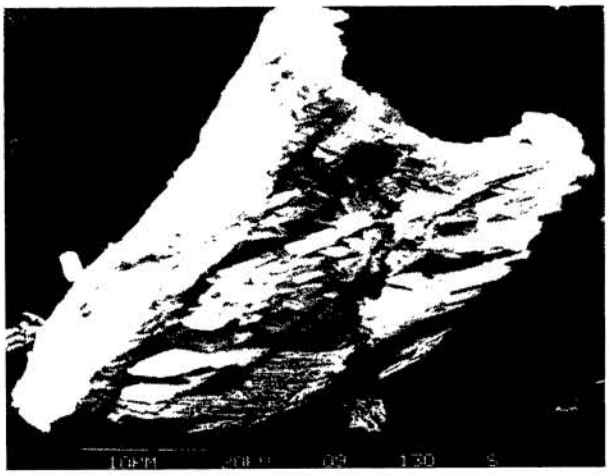

Fig. 3. Highly shocked quartz grain.

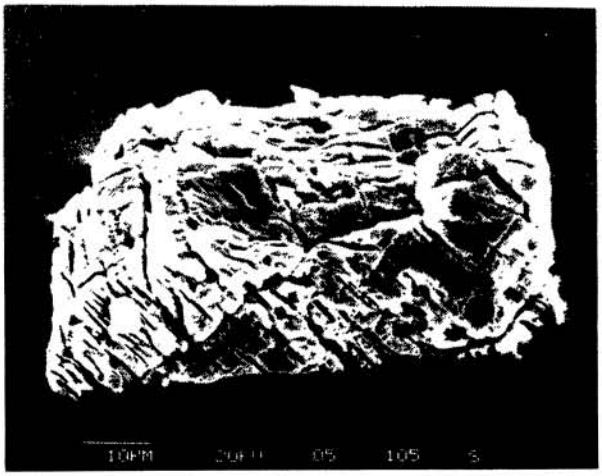

Fig. 4. Shocked K-spar grain. Note multiple sets.

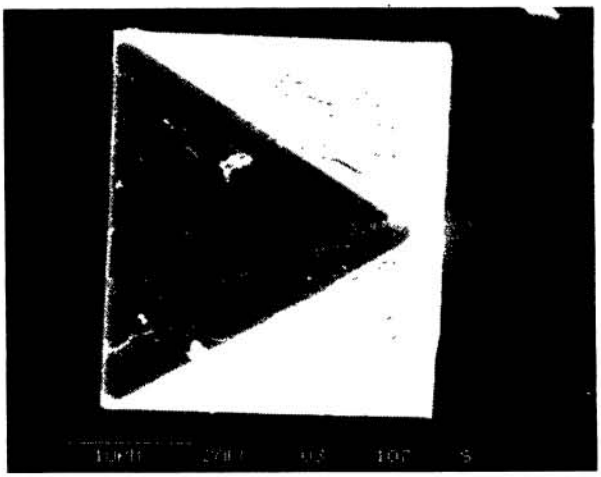

Fig. 5. Magnesioferrite octahedron.

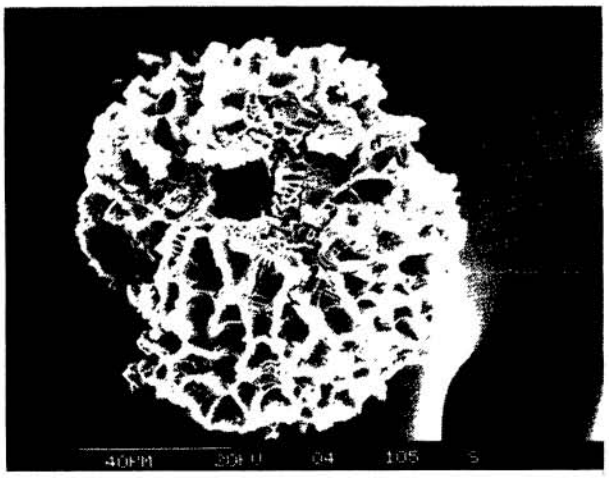

Fig. 6. Spherulitic core of magnesioferrite.