

Figure 19. Highly shocked, partially isotropized(?) pyroxene crystal. Several sets of planar shock lamellae are well developed in various parts of the crystal. Dark material occurring along apparent veinlike fractures may represent areas of incipient isotropization or melting of the crystal. Fragment 318,544; plane polarized light; scale bar 0.1 mm.

plagioclase (maskelynite), similar to associations in Apollo 11 rocks (2, 4, 6). In the third basalt fragment, plagioclase is only partially isotropic, but part of the fragment has fused to an orange-brown glass apparently generated by the post-shock melting of opaque phases (Figure 25). In this specimen, the formation of glass, combined with the rapid quench implied by the preservation of plagioclase, is good evidence for shock-induced melting.

Impact-Produced Glasses

A variety of glasses occurs in the Luna-16 sample, both as individual fragments and in the matrix of microbreccia fragments. The glasses are virtually identical to those described from Apollo 11 and 12 material and are almost certainly of impact origin. The glasses display several features characteristic of origin by shock-induced melting:

- (1) Diversity in color (and presumably in chemical composition) (7). The colors of dense, homogeneous glass fragments range from colorless through light green, greenish brown, and brown, to dark reddish brown and brownish black. Several free-form fragments (spherules, droplets, etc.) were observed (Figures 26-28).

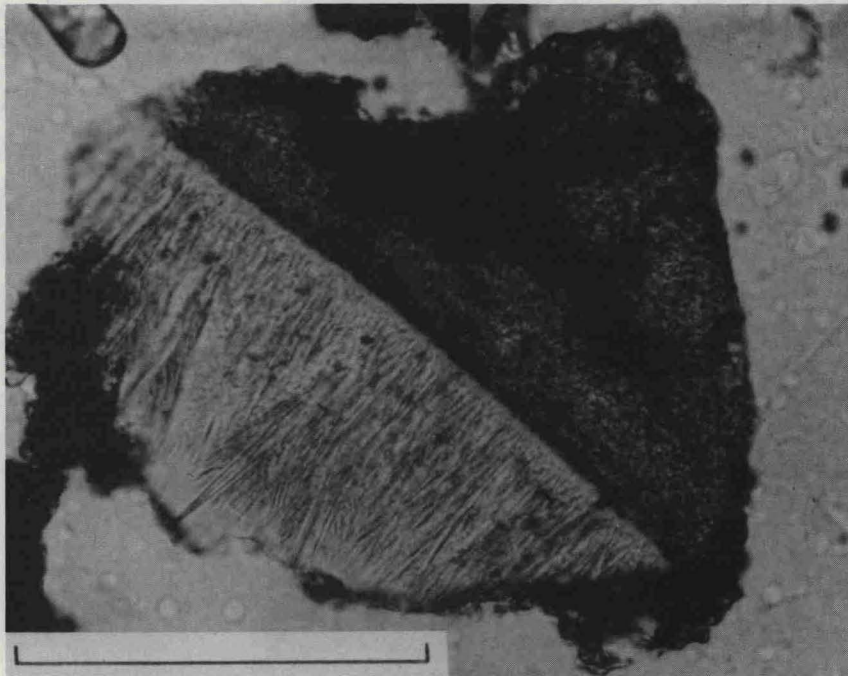


Figure 20A. Sharp contact between clear (plagioclase?) glass and a red-brown pyroxene(?) crystal which shows intense mosaic extinction and partial isotropization along dark veinlike regions. The plagioclase area, which was either maskelynite or shock-melted glass, is now partly devitrified to radiating and sheaflike plagioclase microlites. Fragment 318,362; plane polarized light; scale bar 0.1 mm.

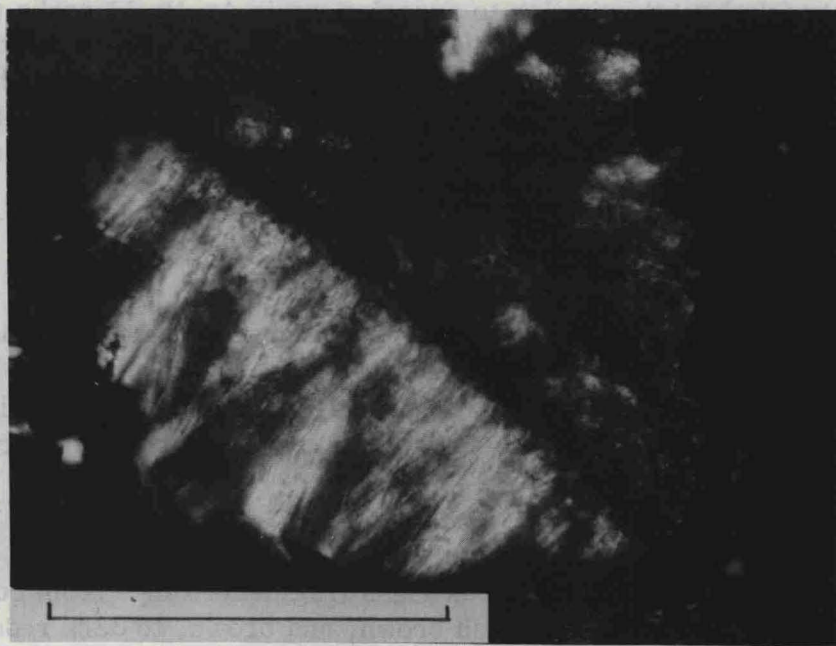


Figure 20B. Same view as in Figure 20A; crossed polarizers. Note devitrification of plagioclase glass area, while adjacent pyroxene(?) region is isotropic in the dark veinlike areas and finely microcrystalline (mosaic extinction?) elsewhere.