MINERALOGY AND MICROTEXTURES OF MELT POCKETS IN THE LOS ANGELES BASALTIC SHERGOTTITE. E. L. Walton and J. G. Spray, Planetary and Space Science Centre, Department of Geology, University of New Brunswick, 2 Bailey Drive, Fredericton, NB E3B 5A3, Canada.

Introduction: A brief description of shock features within Los Angeles, based on optical observations, is given by [1]. Two polished thin sections of stone 1 have been investigated to determine the mineralogy and microtextures of the shock-induced melt pockets using optical microscopy as well as a JEOL 6400 digital scanning electron microscope. This instrument is capable of characterizing compositional variations and microtextures of the melt pockets that are unresolvable using optical techniques.

Melt Pockets: Two texturally distinguishable types have been observed: (1) Small (0.5 mm × 0.70 mm) vesiculated, clast-rich melt pockets with abundant crystallites indicative of quenching. Entrained clasts have subangular morphologies and consist of isotropic whitlockite, isotropic plagioclase enriched in K_2O ($An_{48}Or_{28}$) compared to maskelynite in the adjacent host rock ($An_{40}Or_4$), and curious SiO_2-rich clasts (98.35 wt% SiO_2). Clast size ranges from 0.5 µm to 200 µm. The contact with adjacent host rock minerals is intrusive with abundant stringers and veins of shock-induced melt material extending into them. (2) With increasing volume of melt (3.5 mm × 3.0 mm) textures are dominantly vesicular, clast-poor with flow textures and abundant spheres/blebs of immiscible Fe-sulphides (20 µm to >0.1 µm), comprised of mono- and polycrystalline pyrrhotite. Most vesicles are spherical, indicative of quenching at low confining pressure, however, some are elongated with long axis parallel to the direction of flow. It is interpreted that the vesicles were elongated by fluidal flow in the molten host, followed by quenching to produce glass, and spherical globules of sulphides.

Optical observations show colour variation consisting of light-brown and dark-brown flow-banded glasses. SEM techniques reveal that the dark-brown bands are due to an abundance of small, ≤0.5 µm, spheres of Fe-sulphides within these regions, whereas light-brown areas are free of Fe-sulphides. Individual schlieren can be traced for several millimeters, yet their length and width are highly variable. Contact relationships of individual schlieren with the surrounding glass range from sharp to highly diffuse.

Severely fractured, melt intruded clinopyroxenes adjacent to the melt pockets allow for preferential nucleation of dendritic pigeonite and orthopyroxene crystals that extend from the contact into glass. These textures are consistent with rapid crystallization of the melt. Later devitrification of glasses seeded preferential nucleation of phosphate grains (whitlockite).

Opaque deposits and shock-induced melt glasses in irregular and planar fractures of clinopyroxene are observed to have a very close spatial relationship to the melt zones. A high concentration causes a distinct darkening (opacity) of pyroxene grains in optical microscopy (also referred to as shock blackening).

Discussion: Melt pockets are initiated during shock compression, and continue to form during pressure release when they may vesiculate and are thus not exclusively high-pressure in origin [2]. However, this does not preclude the development of high pressure, high temperature polymorphs within the melt pockets produced by localized cavitation and bubble implosion [3].

[1] Rubin et al. (2000) *Geology, 28,* 1011-1014. [2] Kenkmann et al. (2000*) Meteorit. Plant. Sci., 35,* 1275-1290. [3] Spray, J.G. (1999) *Geology, 27,* 695-698.