composition. These observations show that the latter are not fusion products but diaplectic glasses formed by a shock-induced phase transition in the solid state. Fragments of rocks containing diaplectic plagioclase glass in its original paragenesis with pyroxene and ilmenite are rarely to be found in the soil and breccias. In one rock fragment small inclusions of diaplectic alkali feldspar glass have been observed in a diaplectic plagioclase glass. Microprobe analysis of the inclusion yielded a composition of: Or 75, Ab 14 and An 7 in mole %.

Table 2. Refractive index n_D, density d, and composition (mole %) of lunar diaplectic plagioclase glasses

Sample	No.	An	Ab	Or	n_D	d
10085-25	M22	83	17	0·35	1·5620	2·650
10085-26	M52	84	13	0·3	1·5651	—
10084-106	M35	84	12	0·25	1·5675	2·653
10085-26	M42	89	6	0·2	1·5702	—
10085-26	M53	89	8	0·15	1·5760	—
10085-26	M39	91	6	0·1	1·5709	—
10085-25	M46	91	7	0·5	1·5723	—
10085-25	M40	91	5	0·1	1·5760	2·673
10084-106	M65	92	6	0·25	1·5807	—
10084-106	M34	92	5	0·25	1·5747	2·684
10085-25	M36	92	5	0·1	1·5762	—
10085-26	M51	93	5	0·2	1·5716	—
10085-25	M45	93	5	0·0	1·5772	—
10084-106	M21	93	4	0·1	1·5797	2·684
10084-106	M43	94	4	0·1	1·5802	2·684
10084-106	M48	96	5	0·1	1·5807	—

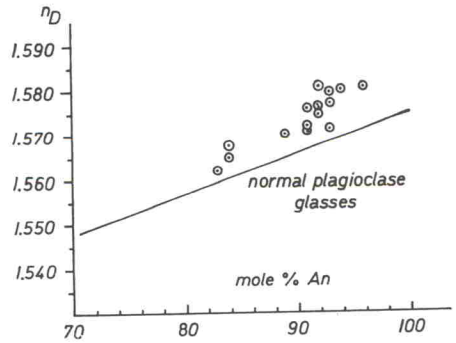

Fig. 6. Refractive indices of diaplectic plagioclase glasses. Solid line: Refractive indices of fused plagioclase (BARTH, 1969).

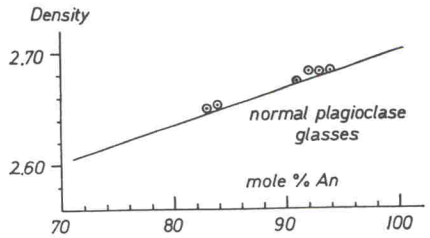

Fig. 7. Densities of diaplectic glasses. Solid line: Densities of fused plagioclase (BARTH, 1969).

Experimentally, diaplectic plagioclase glasses of various composition were obtained by several workers in recovery shock experiments (DECARLI and JAMIESON, 1959; MILTON and DECARLI, 1963; DECARLI *et al.*, 1967; MÜLLER and HORNEMANN, 1967). These experiments indicate the formation of diaplectic plagioclase glass in the range between about 300 and 550 kbar. Determinations of the Hugoniot curves and release adiabats of various plagioclases carried out by MCQUEEN *et al.* (1967),

AHRENS and ROSENBERG (1968) and AHRENS *et al.* (1969) indicate that at pressures exceeding about 300 kbar the plagioclases gradually transform to a high-pressure, high-density phase. AHRENS *et al.* (1969) conclude that this high-pressure polymorph probably corresponds to the rutile-like hollandite structure synthesized from microcline in static high pressure experiments by RINGWOOD *et al.* (1967). AHRENS *et al.* (1969) suggest that this high-pressure phase undergoes a reversion to an amorphous phase (diaplectic glass) on pressure release.

Diaplectic plagioclase glass differs from normal glass obtained by fusion in its behavior on annealing at temperatures below the glass transition temperature T_g. This was demonstrated by BUNCH *et al.* (1968) with diaplectic plagioclase glass from the Manicouagan crater and by DUKE (1968) with maskelynite from the Shergotty meteorite. Normal glasses show no or only slight variation in their physical properties on annealing at or below their glass transition temperature T_g. The T_g of anorthite rich plagioclase glass is not known. However, postulating from a T_g of 815°C for albite glass (VERGANO *et al.*, 1967) a value of about 850°C must be expected for anorthite glass.

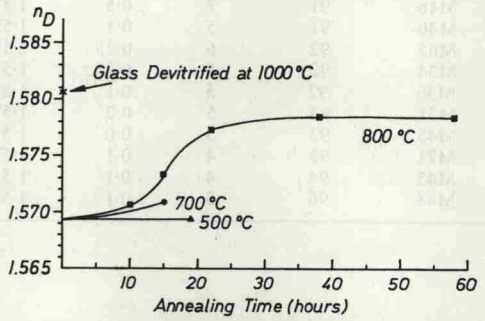

Fig. 8. Results of annealing experiments with diaplectic plagioclase glass (92 mole % An).

Figure 8 shows the results of annealing experiments made on 5 grains of one fragment of diaplectic plagioclase glass (92 mole % An). Annealing at 700 and 800°C, i.e. below T_g, increased the refractive index which at 800°C approached a saturation value of 1·5783. Beginning of partial crystallization was observed at 900°C after annealing for 7 hr. Complete recrystallization was obtained after annealing for 24 hr at 1000°C. The mean refractive index of the devitrified glass was 1·5807. These results are similar to those obtained by BUNCH *et al.* (1968) with diaplectic plagioclase glass of the Manicouagan crater. They do not correspond to the results of DUKE (1968) who found a steep decrease in refractive index of Shergotty maskelynite after annealing at temperatures as low as 450° and 500°C.

A number of lunar diaplectic plagioclase glasses in the soil and breccias show partial recrystallization which looks very similar to that of the experimentally devitrified grains. This indicates that some of the diaplectic plagioclase-bearing rock fragments were exposed to temperatures of at least 900°C over a time period in the order of days, but devitrification at lower temperatures over very long time periods is also possible.