materials and water must be loaded in the cold bomb and the possibility exists of crystallization during the heating-up period which was normally about 3 hr. However, in runs where the same materials were kept dry during initial heating and were then pumped to pressure at the final temperature, identical results were produced and hence the objection does not appear serious. The other types of vessels used were hot-seal bombs and test-tube bombs 14 in. long with cold seals. All these were pumped to pressure at temperature. Samples were normally enclosed in silver capsules (unsealed) and neither leaching nor corrosion caused concern.

Table 5. X-ray powder pattern of phase Z

d (Å)	I	d (Å)	I	d (Å)	I
9·52	16	3·65	10	2·474	4
8·32	1	3·52	16	2·397	2
7·78	1	3·46	16	2·344	1
6·98	4	3·13	6	2·305	1
5·73	4	3·040	6	2·105	1
4·08	20	2·95	4	1·988	1
3·96	18	2·711	2	1·919	1
3·93	10	2·641	1	1·897	2
3·84	8	2·541	1	1·767	1
				1·705	1

Errors in temperature, involving control, measurement, and allowance for gradients in vessels are within ±5°C and in most cases ±3°C. Pressures were measured with Bourdon tube gauges calibrated against a manganin coil gauge and results are believed to be accurate to ±5 per cent.

A1.2. *Notes on phases synthesized*

Phases were identified by direct comparison of X-ray diffractometer patterns. The identification of the full assemblage of phases produced was often a matter of great difficulty, and in general the phases reported are those which constitute the major products. The identifications of heulandite and tobermorite are somewhat doubtful. Only three lines of heulandite were not masked by other phases. The patterns of synthetic epistilbite compared closely with epistilbites from Yugawara hot spring, Japan and from Krossanes, Iceland. Hydrogarnets had refractive indices in the range 1·666–1·725 indicating a considerable water content (Yoder, 1950).

There is evidence (Ellis, 1958) from refractive indices that a complete range of synthetic analcimes from sodium to calcium end-members may have been formed. This is not in accord with observations of Steiner (1955) or Barrer (1950). Synthetic wairakite like the natural material (Coombs, 1955) clearly shows the 200 reflection which is absent in strictly cubic analcime and weak in natural non-cubic analcimes. The 400 reflection, although broadened, was not clearly resolved into a doublet. Oxide mixes yielded the closer approach to the cubic modification. With mordenite also a considerable range of intermediate compositions appeared to have been formed between sodium and calcium end-members. Feldspars all tended towards the high temperature forms (Mackenzie, 1957).

A crystalline phase of unknown composition, "phase Z" was found up to temperatures of about 330° from both glasses and oxide mixes, but mainly from the latter. It was found only from mixed sodium–calcium compositions, and was present usually as small thin rectangular plates, or sometimes as larger irregular tablets. The birefringence was very weak, extinction straight, and the R.I. ranged from 1·473–5 at composition 0·75 Ab to 1·484–6 at 0·25Ab. The X-ray spacings are given in Table 5.