Genesis of the Calc-Alkaline Igneous Rock Suite

12

40r

35-

30

Pressure kb 5 0

15

10

1200





Phases co-existing with

Sub-solidus assemblages

Fig. 2. Results of the dry experimental runs on the highalumina quartz tholeiite

Kev Above liquidus

Phases co-existing with liquid

- clinopyroxene
- garnet
- plagioclase

Sub-solidus assemblages

- px+ga+qz
- px+ga+qz+plag

Fig. 3. Results of the dry experimental runs on the basaltic andesite composition

diagrams it should be pointed out that estimates of degree of crystallization and determination of the solidus temperature are hampered in both the basalt compositions at 27-36 kb and also in the basaltic andesite composition at 36 kb, because of the presence of quench-pyroxene. However, with care, the primary and quench-pyroxenes can be distinguished optically. A brief description of the characteristic features of the petrography of the runs is given as follows.

Plagioclase is distinguished as small to medium sized (50 μ long) acicular crystals sometimes showing multiple twinning in runs near the liquidus. In near-solidus runs plagioclase crystals are difficult to distinguish from amoeboid glass but may be identified by X-ray means. Primary clinopyroxene occurs as medium sized

9 Contr. Mineral. and Petrol., Vol. 18

121

Phases present					Estimated % of glass	Comments and estimated relative proportions of
cpx	plag		qz?	glass	60	Medium grainsize, uncertain presence of quartz
	plag			glass	75	Medium grainsize, estimate 25% plagioclase.
	plag			glass	90	Medium grainsize, estimate 10% plagioclase.
	plag			glass	>99	Very rare plagioclase laths, near-liquidus run.
cpx	plag	ga	qz	glass	30	Medium grainsize; $plag > qz > cpx > ga$.
epx	plag	ga	$\mathbf{q}\mathbf{z}$	glass	50	Medium grainsize; plag, $qz \gg cpx > ga$.
cpx	plag		qz	glass	65	Medium grainsize; plag, $qz \gg cpx$.
	plag		$\mathbf{q}\mathbf{z}$	glass	80	Medium grainsize; approx. equal proportions of
			$\mathbf{q}\mathbf{z}$	glass	>95	Minor small quartz crystals.
				glass	100	Above-liquidus run.
epx	felds		$\mathbf{q}\mathbf{z}$		_	Very fine grained; qz, $cpx \gg felds$; no garnet id
cpx	felds	ga	qz	glass	20	Fine grained except for large, inclusion-filled graph $cpx > qz$, felds $> ga$.
cpx		ga	qz	glass	70	Medium grained, except for large, inclusion-fille $qz > cpx > ga$.
cpx		ga	qz	glass	80	Medium grained, except for large, inclusion-fille $qz > ga > cpx$.
			qz	glass	>95	Minor quartz, fine grained.
				glass	100	Above liquidus run.
cpx			qz		Same in	Fine grained; solidus or near-solidus run; glass cpx, qz only phases identified.

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