TABLE 3

Experimental crystallization of Auckland Island olivine basalt at various pressures and temperatures

Pressure (kb)	Temperature (°C)	Time (mins)	Sample capsule	Results
A. *Dry conditions*				
9.0	1280	30	Pt	Olivine + glass. Very near liquidus
9.0	1260	30	Pt	Olivine + clinopyroxene + glass
11.3	1320	30	Pt	Above liquidus
11.3	1310	30	Pt	Clinopyroxene + rare orthopyroxene + minor olivine. Clinopyroxene with rare parallel growth of orthopyroxene
13.5	1350	30	Pt	Above liquidus
13.5	1330	30	Pt	Uncommon orthopyroxene and clinopyroxene + glass. Very near liquidus
13.5	1330	60	Graphite	Clinopyroxene + orthopyroxene + glass Clinopyroxene > orthopyroxene
13.5	1325	60	Pt	Orthopyroxene + glass
13.5	1320	30	Pt	Clinopyroxene + rare orthopyroxene + glass Cpx ⩾ Opx
13.5	1320	60	Graphite	Clinopyroxene + orthopyroxene + glass Cpx > Opx
13.5	1300	30	Pt	Clinopyroxene + minor orthopyroxene + glass (~30% crystallization)
18.0	1380	60	Graphite	Above liquidus
18.0	1370	60	Graphite	Clinopyroxene + glass. Cpx may be quench
18.0	1360	60	Graphite	Clinopyroxene + possible rare orthopyroxene + glass
B. *"Wet" conditions*				
13.5	1200	30	Pt	Olivine + glass. Very near liquidus
13.5	1190	30	Pt	Olivine + orthopyroxene + glass. Opx > ol
13.5	1180	30	Pt	Olivine + orthopyroxene + glass. Opx ⩾ ol
13.5	1160	30	Pt	Olivine + orthopyroxene + clinopyroxene + glass. Opx > Cpx. Minor olivine. Possible amphibole
13.5	1150	30	Pt	Olivine + orthopyroxene + clinopyroxene + glass
13.5	1130	30	Pt	Olivine + orthopyroxene + amphibole + glass. Clinopyroxene not certain
18.0	1260	30	Pt	Orthopyroxene + glass. Very near liquidus
18.0	1240	30	Pt	Orthopyroxene + clinopyroxene + glass. Opx > Cpx
18.0	1200	30	Pt	Orthopyroxene + clinopyroxene + glass. Orthopyroxene and clinopyroxene intergrowths well developed Opx ≃ Cpx
C. *Controlled Water Contents*				
15.3	1200	20	Pt	*With 3% H_2O.* Above liquidus
14.4	1200	30	Pt	*With 2% H_2O.* Above liquidus
14.4	1170	30	Pt	*With 2% H_2O.* Orthopyroxene + clinopyroxene + rare olivine. Opx common
15.3	1200	20	Pt	*With 2% H_2O.* Rare large orthopyroxene, no definite olivine.
15.3	1170	30	Pt	*With 2% H_2O.* Common orthopyroxene and possible rare olivine

stricted field of orthopyroxene crystallization. The analytical data on the pyroxene compositions (table 4) demonstrate a very high degree of hypersthene solid solution in the clinopyroxene and somewhat lower Al_2O_3 contents in both pyroxenes than those observed in the previous olivine basalt. The clinopyroxenes have compositions suggestive of very magnesian pigeonites but comparison with the sub-calcic (9–10% CaO) clinopyroxenes previously obtained experimentally does not provide any evidence as yet for a compositional break between augites, sub-calcic augites and compositions near to pigeonite. The coexistence of orthopyroxenes with slightly varying CaO content with this range of clinopyroxene compositions suggests that we are dealing with the "roof" of the two-pyroxene miscibility gap, the orthopyroxene side being "steep" (i.e. CaO content varies only slightly with temperature and with $Mg/(Mg+Fe^{++})$ ratio) while the clinopyroxene side in contrast is "shallow" and the hypersthene solid solution rapidly increases for small increases in temperature