

Table 3. Analyses of garnets from 9 different specimens all collected from one lava flow from Black Spur near Healesville, Victoria. Grain mounts were prepared to determine the variation in composition of garnet through one lava flow. Specimen numbers range from 2043 (a)—2043 (j)

Specimen	(a)	(b)	(c)	(d)	(f)	(g)	(h)	(i)	(j)	Average
No. of analyses	10	10	32	20	10	10	10	12	10	124
SiO <sub>2</sub>	38.2 <sup>a</sup>	38.7 <sup>a</sup>	38.3 <sup>a</sup>	38.6 <sup>a</sup>	36.7 <sup>a</sup>	38.7 <sup>a</sup>	38.3 <sup>a</sup>	38.3 <sup>a</sup>	36.0 <sup>a</sup>	37.9 <sup>a</sup>
TiO <sub>2</sub>	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Al <sub>2</sub> O <sub>3</sub>	21.5	22.1	21.6	21.8	21.8	22.0	22.0	22.2	21.6	21.3
FeO	33.0	33.9	32.6	32.5	31.0	33.7	32.6	32.7	30.4	32.6
MnO	2.4	1.4	1.6	1.5	2.4	1.8	1.5	2.0	1.3	1.8
MgO	4.6	5.0	5.3	5.6	4.7	4.8	5.3	5.1	5.2	5.1
CaO	1.6	1.7	1.6	1.7	1.7	1.7	1.7	1.6	1.6	1.7
	101.5	103.0	101.2	101.9	98.5	102.9	101.6	102.1	96.3	101.0
Mol. prop.										
Ti-And	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Gross	3.7	3.8	3.6	3.8	4.0	3.8	3.9	3.6	3.9	3.9
Pyrope	18.0	19.2	20.6	21.6	19.1	18.5	20.7	19.8	21.6	20.0
Alm	72.3	73.1	71.4	70.5	70.6	72.9	71.3	71.3	70.7	71.4
Spess	5.2	3.1	3.6	3.3	5.5	4.0	3.3	4.5	3.0	4.0

<sup>a</sup> Denotes calculated content.

Table 4. Analyses of garnets from 4 different specimens all collected from the Deddick granodiorite. Grain mounts were used to check the variation in composition of garnet in the granodiorite

Specimen	2001	2045	2046	2047	Average
No. of analyses	10	10	16	10	46
SiO <sub>2</sub>	36.4 <sup>a</sup>	38.2 <sup>a</sup>	36.6 <sup>a</sup>	35.5 <sup>a</sup>	36.4 <sup>a</sup>
TiO <sub>2</sub>	0.2	0.2	0.2	0.2	0.2
Al <sub>2</sub> O <sub>3</sub>	21.8	21.4	21.8	21.4	21.6
FeO	32.1	35.1	32.8	30.8	32.7
MnO	2.1	3.7	1.3	2.3	2.3
MgO	4.2	2.9	4.4	4.0	3.9
CaO	1.4	1.4	1.4	1.7	1.5
	98.2	102.9	98.5	95.9	98.6
Mol. prop.					
Ti-And	0.6	0.8	0.8	0.8	0.8
Gross	3.5	3.1	3.3	4.0	3.5
Pyrope	17.2	11.2	18.0	21.1	15.9
Alm	73.8	76.7	74.9	69.3	74.5
Spess	4.9	8.2	3.0	4.8	5.3

<sup>a</sup> Denotes calculated content.

of Table 5 shows that with one exception (2053) these garnets are quite similar in composition. In order to compare the host rock chemistry with the garnet composition, partial analyses of 7 host rocks have been conducted. These are listed in Table 6 and it is evident from this table that the iron and magnesium contents of 6 of the host rocks are closely similar, but specimen 2053 is distinct. Because the chemistry of the host rocks is similar, apart from one case, little can be said about

Table 5. Analyses of garnets (in grain mounts) from a variety of Victorian Palaeozoic acid calc-alkaline host rocks

Specimen	2043	2044	2048	2049	2050	2051	2052	2053	2054	2055	2056	Dedick average (from Table 4)
No. of analyses	124	87	15	12	16	15	9	16	24	10	10	46
SiO <sub>2</sub>	37.9 <sup>a</sup>	37.6 <sup>a</sup>	37.8 <sup>a</sup>	37.5 <sup>a</sup>	37.4 <sup>a</sup>	36.8 <sup>a</sup>	38.4 <sup>a</sup>	36.4 <sup>a</sup>	37.7 <sup>a</sup>	35.5 <sup>a</sup>	36.7 <sup>a</sup>	36.4 <sup>a</sup>
TiO <sub>2</sub>	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Al <sub>2</sub> O <sub>3</sub>	21.8	21.7	21.9	21.7	21.6	21.6	21.8	21.5	21.7	21.4	21.6	21.6
FeO	32.5	32.2	31.5	32.3	31.9	32.0	32.3	37.2	32.4	29.4	30.1	32.7
MnO	1.8	1.5	1.4	1.6	1.6	1.9	1.5	1.5	1.7	1.8	1.2	2.3
MgO	5.1	5.2	5.7	5.0	5.0	4.5	5.5	2.0	5.0	5.1	5.7	3.9
CaO	1.7	1.6	1.7	1.6	1.8	1.6	1.8	1.0	1.7	1.7	1.9	1.5
	101.0	100.0	100.2	99.9	99.5	98.6	101.5	99.8	102.9	95.1	97.4	98.6
Mol. prop.												
Ti-And	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Gross	3.9	3.7	3.9	3.7	4.3	3.8	4.2	2.0	3.9	4.2	4.7	3.5
Pyrope	20.0	20.7	22.5	19.8	19.9	18.2	21.3	8.2	19.7	21.4	23.1	15.9
Alm	71.4	71.4	69.6	72.0	71.3	72.8	70.4	85.5	71.8	69.3	68.6	74.5
Spess	4.0	3.4	3.2	3.7	3.7	4.4	3.3	3.5	3.8	4.3	2.8	5.3

<sup>a</sup> Denotes calculated content.

any relation between the host rock chemistry and the garnet composition, except that it is significant to note that the one exceptional garnet composition (2053) of Table 5 occurs in the one exceptional host rock composition of Table 6, and the  $\frac{\text{MgO}}{\text{FeO}}$  ratio of the garnet follows that of the host rock. This suggests, but does not prove, a link between the host rock composition and the garnet composition.

## 2. High Pressure Investigation of a Natural Garnet-Bearing Rhyodacite II Composition

The results of the high pressure runs are summarized in Table 7.

Three runs at 9 kb have been conducted. At 820°C, well below the liquidus, the phases present are quartz, plagioclase, amphibole, mica and rare garnet. Two runs conducted at 840°C show different degrees of crystallization reflecting the possible variation in  $P_{\text{H}_2\text{O}}$  in the experimental procedure adopted for these wet runs. The phases present in the run showing a greater degree of crystallization are quartz, plagioclase, mica and uncertain amphibole and clinopyroxene. In the second run plagioclase and amphibole are the only phases present. This run serves the purpose of illustrating the nature of the