

Table 5  
Calculated compositions of liquid fractionates and crystalline residua derived from the high-alumina quartz tholeiite at 9–10 kb under wet conditions\*.

| Pressure  |  | 9 kb                                   | 10 kb                                   | 10 kb  |      |
|---|--|--|---|--|------|
| Temperature                                     |  | 1040°C                                 | 960°C                                   | 920°C  |      |
| Nature and estimated<br>% of crystals extracted | Initial liquid   | 18% cpx<br>5% amph<br>2% opx<br>1% ilm | 18% cpx<br>25% amph<br>2% opx<br>1% ilm | 18% cpx<br>32% amph<br>3% plag<br>2% opx<br>1% ilm |      |
| <i>Liquid fractionate</i>                       |  |  |   |  |      |
|   | SiO <sub>2</sub>   | 52.9                                   | 55.9                                    | 59.7   | 64.5 |
|   | TiO <sub>2</sub>   | 1.5                                    | 0.8                                     | 0.4  | 0.1  |
|   | Al <sub>2</sub> O <sub>3</sub>                                 | 16.9                                   | 19.4                                    | 20.2   | 19.9 |
|   | Fe <sub>2</sub> O <sub>3</sub>                                 | 0.3                                    | 0.4                                     | 0.5  | 0.7  |
|   | FeO  | 7.9                                    | 7.2                                     | 5.8  | 3.7  |
|   | MnO  | 0.2                                    | 0.3                                     | 0.3  | 0.4  |
|   | MgO  | 7.0                                    | 4.4                                     | 2.1  | 2.0  |
|   | CaO  | 10.0                                   | 7.8                                     | 6.7  | 3.9  |
|   | Na <sub>2</sub> O  | 2.7                                    | 3.3                                     | 3.4  | 3.6  |
|   | K <sub>2</sub> O   | 0.6                                    | 0.8                                     | 0.9  | 1.0  |
|   |  | 100.0                                  | 100.3                                   | 100.0  | 99.8 |
| Mol. Prop.                                      |  |  |   |  |      |
|   | $\frac{100 \text{ MgO}}{\text{MgO} + \text{FeO}_{\text{tot}}}$ | 60.4                                   | 50.9                                    | 37.5   | 45.3 |
| <i>CIPW norm</i>                                |  |  |   |  |      |
|   | Qz   |  | 5.5                                     | 14.4   | 25.3 |
|   | Or   |  | 4.8                                     | 5.4  | 5.9  |
|   | Ab   |  | 27.9                                    | 28.8   | 30.5 |
|   | An   |  | 35.7                                    | 33.2   | 19.3 |
|   | Cor  |  | —                                       | 1.4  | 5.8  |
|   | Diop   |  | 2.4                                     | —  | —    |
|   | Hyp  |  | 21.9                                    | 15.3   | 12.1 |
|   | Mt   |  | 0.6                                     | 0.7  | 1.0  |
|   | Ilm  |  | 1.5                                     | 0.8  | 0.2  |
| <i>Crystal residuum</i>                         |  |  |   |  |      |
|   | SiO <sub>2</sub>   |  | 44.8                                    | 43.0   | 42.7 |
|   | TiO <sub>2</sub>   |  | 2.5                                     | 2.7  | 2.7  |
|   | Al <sub>2</sub> O <sub>3</sub>                                 |  | 9.7                                     | 12.3   | 14.2 |
|   | FeO  |  | 9.1                                     | 10.1   | 11.2 |
|   | MgO  |  | 14.6                                    | 12.9   | 11.0 |
|   | CaO  |  | 16.6                                    | 13.8   | 14.8 |
|   | Na <sub>2</sub> O  |  | 1.0                                     | 1.8  | 1.9  |
|   | K <sub>2</sub> O   |  | 0.04                                    | 0.2  | 0.2  |
|   |  |  | 98.34                                   | 96.8   | 98.7 |
| Mol. Prop.                                      |  |  |   |  |      |
|   | $\frac{100 \text{ MgO}}{\text{MgO} + \text{FeO}}$              |  | 74.2                                    | 69.5   | 63.7 |

\* The orthopyroxene analysis obtained at 1040°C, 9 kb has been used in calculations for other experimental runs since it could not be analyzed in these runs. Since only 2% of orthopyroxene is extracted, any variations in its composition will not seriously affect the compositions of the liquid fractionates or crystalline residua. Also 1% of ilmenite is extracted as part of the crystalline residua. This is because an accessory iron-titanium rich opaque mineral phase occurred in the experimental runs in graphite capsules where no iron loss took place. This phase could not be analyzed quantitatively and as a first approximation for these calculations was taken as ilmenite.