

TABLE 4. Refractive indices and densities of decomposition products of muscovite ("a" association).

| | Platy mineral | Isotrop. weakly birefring. | Kyanite* |
|----------------------------|----------------------------|------------------------------------|--|
| Refractive index | Ng' = 1.735 Np' = 1.725 | Ng' = 1.558 ± 0.003 Np' = 1.549 | Ng = 1.728 Nm = 1.722 Np = 1.713 |
| Density, g/cm ³ | 3.60 ± 0.02 | 2.82 ± 0.02 | 3.56-3.68 |

*Larsen and Berman, 1965; **AlI ± 0.003.

TABLE 5. Interplanar spacings of "a"-type neogenic association.

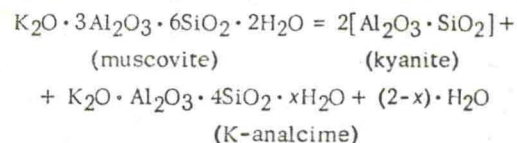
| a | | b | | c | | a | | b | | c | |
|-----------------|----|--|----|------------|---|-----------------|----|--|---|------------|----|
| Association "a" | | K ₂ O·Al ₂ O ₃ ·4SiO ₂ ·H ₂ O** | | Kyanite*** | | Association "a" | | K ₂ O·Al ₂ O ₃ ·4SiO ₂ ·H ₂ O** | | Kyanite*** | |
| d* | l | d | l | d | l | d* | l | d | l | d | l |
| 5.02 | 4 | 5.67 | 10 | — | — | 2.22 | 3 | 2.22 | 4 | — | — |
| 4.65 | 7 | 4.92 | 2 | — | — | 2.15 | 1 | — | — | 2.16 | 6 |
| 4.50 | 2 | — | — | — | — | 1.98 | 6 | — | — | 1.95 | 10 |
| 4.33 | 2 | — | — | 4.35 | 6 | 1.93 | 8 | 1.90 | 6 | — | — |
| 3.99 | — | — | — | — | — | 1.86 | 1 | 1.87 | 4 | — | — |
| 4.05 | 5 | — | — | — | — | 1.77 | 1 | — | — | 1.76 | 6 |
| 3.83 | 1 | — | — | — | — | 1.75 | 1 | 1.74 | 8 | — | — |
| 3.68 | 5 | — | — | — | — | 1.59 | 5 | — | — | 1.60 | 6 |
| 3.52 | 2 | 3.46 | 10 | — | — | 1.56 | 1 | — | — | — | — |
| 3.38 | 6 | — | — | 3.33 | 8 | 1.52 | 1 | — | — | 1.50 | 2 |
| 3.28 | 4 | — | — | — | — | 1.51 | 1 | — | — | — | — |
| 3.21 | 7 | — | — | 3.14 | 8 | 1.47 | 1 | — | — | 1.48 | 6 |
| 2.97 | 10 | 2.94 | 8 | — | — | 1.39 | 4 | 1.41 | 6 | 1.40 | 4 |
| 2.68 | 10 | 2.68 | 2 | 2.69 | 6 | 1.37 | 10 | 1.36 | 6 | 1.38 | 10 |
| 2.61 | 5 | — | — | — | — | 1.34 | 2 | — | — | 1.34 | 6 |
| 2.54 | 4 | 2.51 | 4 | 2.52 | 7 | 1.33 | 1 | — | — | — | — |
| 2.36 | 3 | 2.42 | 2 | 2.37 | 8 | 1.30 | 1 | — | — | — | — |
| 2.31 | 1 | — | — | — | — | 1.29 | 1 | — | — | — | — |

*Corrected with respect to NaCl; **Barrer, Baynham, 1956; ***Seki, Kennedy, 1964.

Comparison of all the data enables us to infer that one of the minerals formed is kyanite (for comparison Table 4 gives the literature values of the density and refractive index of kyanite - Larsen and Berman, 1965); col. c of Table 5 gives its interplanar spacings (Mikheyev, 1957). From the other lines on the powder pattern we can assume that a second mineral formed by breakdown of muscovite is the potassium analog of analcime (K₂O·Al₂O₃·4SiO₂·H₂O).¹ Column b (table 5) gives the interplanar spacings of this mineral from data of Barrer and Baynham (1956). Unfortunately, a search revealed no literature on the density and re-

fractive indices of this mineral (the report by these authors mentions only that the mean refractive index is ~1.490), so that its identification from X-ray data cannot be taken as final.

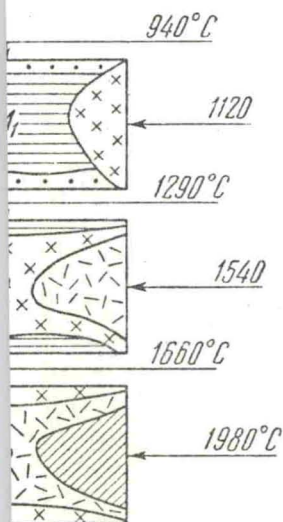
Thus at a pressure of 66 kbar in the range 1050-1350°C, muscovite decomposes, probably by the following scheme:



(Since the water content of K-analcime is not accurately known, we do not know whether free water is formed during breakdown of muscovite.)

Above 1350°C the kyanite + K-analcime

¹An artificial mineral synthesized by Barrer and Baynham, 1956.



of location of neogenic phases sections of specimens from 1, 2, and 3 (table 3).

l of initial muscovite of initial muscovite

ry mineral of "a" type ry mineral of "b" type ry mineral of "c" type ation in text)

ch sketch are the temperatures hot zones of the specimens.

men where the temperature muscovite is replaced by a of the "a" type. Figure 1, of a thin section, whose temperature of 940°C (relict tained in this zone). In the specimen the temperature and an association of the "a" . The boundary between e and the "a" material corately to an isothermal sur-

s under the microscope, "a"- erial is brown. In the sector act with muscovite we see s an association of several ctor displays pointed (up to is and round (0.016 x 0.008 platy (0.04 x 0.008 mm) adary of the "a"-type neogenic rpendicular to the cleavage ovite, we observe development als at the cleavage planes of the main front of muscovite e 4 shows the densities and of the minerals of this asso- ol. a) gives the interplanar from the powder pattern of