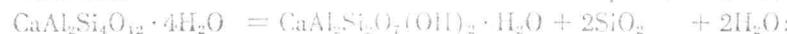


TABLE I  
Chemical analyses and optical properties of lawsonite and anorthite  
used as starting materials

Oxide	A	B	C
SiO <sub>2</sub>	31.11	33.13	44.49
TiO <sub>2</sub>	0.29	nd	nd
Al <sub>2</sub> O <sub>3</sub>	30.94	35.95	36.00
Fe <sub>2</sub> O <sub>3</sub>	4.56	0.45	0.03
FeO	0.13	0.29	nd
MnO	0.04	nd	nd
MgO	0.03	0.03	0.01
CaO	17.54	19.27	19.49
Na <sub>2</sub> O	0.06	0.65	0.59
K <sub>2</sub> O	0.14	0.05	0.03
H <sub>2</sub> O	10.72		
H <sub>2</sub> O+ <sup>-</sup>		0.63	nd
H <sub>2</sub> O- <sup>+</sup>		0.25	nd
Total	99.53	100.77	100.72
Refractive Indices			
	A	B	C
$\alpha$	1.565 ± 0.002	1.5743	1.5743
$\gamma$	1.636 ± 0.002	1.5830	1.5830
An %		91.3	94.9
			96 ± 2

- A. Lawsonite, Analyst, D. Thaemlitz; optical properties, G. A. Davis; Blake Gardens, North Berkeley, California (Davis and Pabst, 1960).
- B. Anorthite, Analyst, Y. Kawano; optical properties, I. Kato; crystal lapilli erupted in 1940, Miyake-jima volcano, Tokyo Prefecture, Japan (Kawano and Aoki, 1960).
- C. Anorthite, Analyst, H. S. Washington; optical properties, crystal lapilli erupted in 1874, Miyake-jima volcano, Tokyo Prefecture, Japan (Kawano and Aoki, 1960).
- D. Anorthite, Miyake Island, Tokyo Prefecture, Japan. Optical properties at a reversal stage An percent determination, Crawford.

The simplest reactions which field evidence suggests bear on this problem involve:



Some data bearing on (1) are available, and we can make some reasonable guesses concerning (2).

Thermodynamic data (table 3) are available for leonardite, a close relative of laumontite. Coombs (1952) described the conditions for the reversible conversion of laumontite to leonardite. Laumontite in dry air loses water forming leonardite,  $\text{Ca}_2\text{Al}_4\text{Si}_{12}\text{O}_{24} \cdot 7\text{H}_2\text{O}$ . Leonardite, when soaked in liquid water at room temperature, is converted to laumontite. These observations