montmorillonitic materials in environments other than marine. Caution must therefore be exercised in the use of glauconite as an environmental indicator.

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DEHYDRATION OF DIASPORE AT WATER PRESSURES FROM 15 to 15,000 PSI

JON N. WEBER, *Materials Research Laboratory, Pennsylvania State University.*

The dehydroxylation of well-crystallized diaspore from Chester, Mass. has been investigated by differential thermal analysis at H_2O pressures ranging from 15 to 15,000 psi. Experimental techniques and the methods used to process data taken from the thermograms have been described in detail by Weber and Greer (1965).

MINERALOGICAL NOTES

TABLE 1. DEHYDRATION DATA FOR DIASPORE

Characteristic temperature[1] ° C.	P_{H_2O} psi	Peak temperature[1] ° C.
(1) *80–100 mesh grain size*		
524	14.7	594
520	14.7	596
522	14.7	596
520	14.7	600
533	41	601
554	78	610
554	115	623
548	169	620
548	282	619
553	465	—
549	504	624
513	1360	590
531	2360	590
544	5740	579
550	7000	—
519	10570	—
559	15600	—
(2) *−325 mesh grain size*		
519	14.7	581
523	14.7	582
527	14.7	583
525.5	14.7	581
523.5	14.7	585
524	14.7	591
531	51	572
542	84	600
538	112	602
545	182	590
545	325	598
555	345	595
546	394	593
546	425	607
551	626	599
547	1285	583
549	2420	576
561	8400	566

[1] "Characteristic temperature" is defined as the temperature at the point of intersection of the DTA base line and the tangent drawn at the point of maximum slope of the DTA curve. This measure of the reaction temperature is more reproducible than is peak temperature (temperature at which the DTA curve is most remote from the base line). The DTA apparatus has been calibrated with substances of known reaction temperature (fusion or inversion) so that the temperatures listed in column one closely represent the temperatures at which the dehydroxylation reaction began.

Pressure-temperature data are listed in Table 1 and are compared graphically in Fig. 1 with the diaspore⇌corundum+water boundary determined by Kennedy (1959). The pressure-temperature (p-t) curve is essentially vertical at all water pressures attained, and grain size, at least in the range 80 to −325 mesh, appears to have little effect on the position
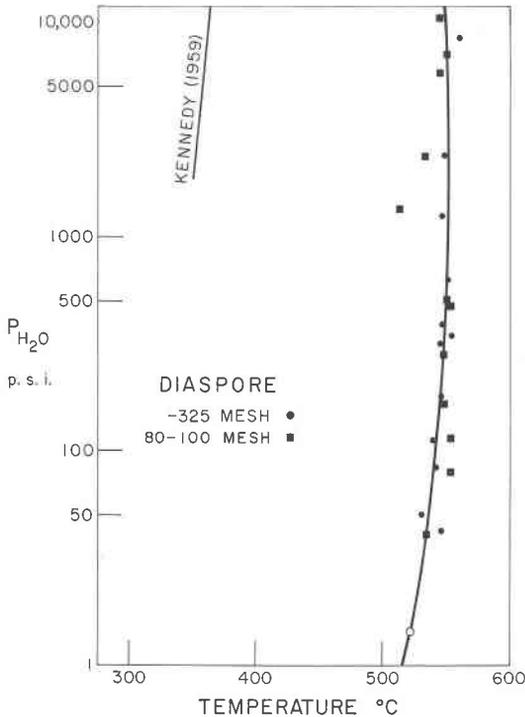
FIG. 1. Pressure-temperature curve for the dehydroxylation of diaspore (−325 mesh particle size and 80–100 mesh particle size) determined by differential thermal analysis. Ten points fall within the open circle at $P_{H_2O}=1$ atm (four replicate determinations for 80–100 mesh particle size and six replicates of −325 mesh samples). The equilibrium p-t curve obtained by Kennedy (1959) is shown for comparison.

of the p-t curve. The dehydroxylation behaviour of diaspore differs from that of kaolinite, dickite, halloysite and serpentine studied under the same experimental conditions (Roy and Weber, 1964) in that the apparent dehydration temperature for the latter group of minerals increases with increasing P_{H_2O} until the region 500 to 1000 psi is reached, above which dehydration temperatures decrease irregularly with further increase in water pressure. Reversal in the slope of the p-t curve has been

ascribed to metastable persistence of the hydrous minerals above the limit of stability in the relatively low water pressure range. At higher pressures, the "catalytic" or "solvent" effect of water facilitates dehydroxylation of the metastable phase. Thus in the case of the kandites and serpentine, the temperature required for dehydration under the dynamic conditions of differential thermal analysis (DTA) above 1 atm P_{H_2O} is always above the maximum equilibrium temperature at which these hydrates are stable, and increases with increasing water pressure between 1 atm and several hundred or more psi. At higher water pressures, the dehydration temperature approaches, with considerable scatter, the equilibrium p-t curve. The p-t curve for the dynamic dehydration of diaspore is displaced from the equilibrium curve by approximately 150 to 200° C. and falls well within the stability field of corundum+water. The absence of any appreciable variation in dehydration temperature in the pressure range investigated demonstrates the sluggishness of this reaction even under water pressures as high as 15,000 psi.

The heat of dehydration, ΔH, determined from the area under the DTA curve for all analyses at $P_{H_2O} = 1$ atm is 91.9 cal/gm for -325 mesh samples, and 91.0 cal/gm for samples whose grain size ranged from 80 to 100 mesh. The degree of dispersion of the ΔH measurements is indicated by a standard deviation of about 7 cal/gm.

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