TABLE 1

$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	X-Ray Data on Forms of $\text{Li}_3\text{BN}_2$ * Wentorf's phase(2) $\text{Li}_3\text{BN}_2(W)$ Li <sub>3</sub> BN <sub>2</sub> (3) $\text{Li}_3\text{BN}_2$ (quenched from (quenched from high pressure) high pressure)						
3.81       m       3.73       10       5.60       m       5.57       20         3.50       s       3.47       50       3.50       mw         2.82       vs       2.78       100       3.25       w       3.28       5         2.63       s       2.67       20       3.08       ms       3.06       45         2.63       s       2.63       30       2.85       w       2.84       15         2.63       s       2.63       30       2.85       w       2.84       15         2.63       s       2.63       30       2.85       w       2.84       15         2.63       s       2.67       m       2.67       40         2.24       w       2.22       5       2.67       m       2.59       15         2.07       vs       2.07       15       2.50       mw       2.50       5         2.07       vs       2.05       25       2.35       w       2.15       10         1.83       vw       1.91       5       2.25       m       2.27       10         1.64       vs       1.64       1	d(A)	<u> </u>	$d(\hat{X})$ $I/I_0$	d(A) I/Io	<u>a(A)</u>	$\frac{I/I}{O}$	
3.50 s 3.47 50 3.50 mW 3.27 10 3.34 mW 2.82 vs 2.78 100 3.25 w 3.06 45 2.67 20 3.08 ms 3.06 45 2.63 s 2.63 30 2.85 w 2.84 15 2.78 s 2.78 100 2.24 w 2.22 5 2.67 m 2.67 40 2.56 mw 2.59 15 2.07 vs 2.07 15 2.50 mw 2.59 15 2.07 vs 2.05 25 2.35 w 1.93 w 1.91 5 2.25 m 2.27 10 1.83 vw 2.05 2.15 ms 2.15 10 1.84 vs 1.69 5 1.92 w 1.93 5 1.64 vs 1.64 20 1.85 mw 1.85 15 1.65 m 1.55 10 1.68 vw 1.69 5 1.68 w 1.69 5 1.69 5 1.92 w 1.93 5 1.64 vs 1.64 20 1.85 mw 1.74 5 1.65 m 1.55 10 1.68 vw 1.69 5 1.66 m 1.65 10 1.48 w 1.60 m 1.65 10 1.60 m 1.61 5			3.73 10				
2.82       VS       2.78	3.50	S		3.50 mw 3.34 mw			
2.63	2.82	νs	2.78 100 2.67 20	3.08 ms	3.06	45	
2.24	2.63	S	2.63 30	2.78 s	2.78	100	
2.07       VS       2.07       15       2.35       mw       2.27       10         1.93       W       1.91       5       2.25       m       2.27       10         1.83       VW       2.07       VW       2.03       15         1.83       VW       2.03       m       2.03       15         1.74       m       1.74       10       1.96       W       1.97       5         1.69       5       1.92       W       1.93       5         1.64       VS       1.64       20       1.85       mw       1.85       15         1.55       m       1.63       10       1.73       mw       1.69       5         1.48       W       1.64       m       1.65       10         1.42       W       1.60       m       1.61       5         1.50       VW	2.24	W	2.22	2.56 mw	2.59	15	
1.93 W 1.91 S 2.25 M 2.15 10  1.83 VW 2.03 M 2.03 15  1.74 M 1.74 10 1.96 W 1.97 5  1.69 5 1.92 W 1.93 5  1.64 VS 1.64 20 1.85 MW 1.85 15  1.55 M 1.55 10 1.68 VW 1.69 5  1.48 W 1.62 M 1.65 10  1.48 W 1.62 M 1.63 10  1.42 W 1.50 VW	2.07	vs	2.05 25	2.35 W			
1.74 m 1.74 10 1.96 w 1.97 5 1.69 5 1.92 w 1.93 5 1.64 vs 1.64 20 1.85 mw 1.85 15 1.55 m 1.55 10 1.68 vw 1.69 5 1.64 w 1.65 10 1.48 w 1.62 m 1.63 10 1.42 w 1.50 vw	1.93	W	1.91 5	2.15 ms			
1.64     VS     1.64     20     1.85     mw     1.85     15       1.63     10     1.73     mw     1.74     5       1.55     m     1.55     10     1.68     VW     1.69     5       1.64     m     1.65     10       1.48     W     1.62     m     1.63     10       1.42     W     1.53     m     1.61     5       1.42     W     1.50     VW	1.83	vw		2.03 m		15	
1.64 VS 1.64 20 1.73 mw 1.74 5 1.63 10 1.73 mw 1.69 5 1.64 m 1.65 10 1.48 w 1.62 m 1.63 10 1.42 w 1.53 m 1.50 vw	1.74	m	1.69 5	1.92 W	1.93	5 15	
1.55 m 1.55 10 1.66 vw 1.65 10 1.48 w 1.62 m 1.63 10 1.60 m 1.61 5 1.42 w 1.53 m 1.50 vw	1.64	vs	1.63 10	1.73 mw	1.74	5	
1.48 W 1.60 m 1.61 5 1.42 W 1.53 m 1.50 vw	1.55	m	1.55 10	1.64 m	1.65	10	
1.50 vw	1.48	W		1.60 m			
1 // W	1.42	W		1.50 vw			
1.40 w	1.40	W		1.44 W 1.41 W			

<sup>\*</sup> X-ray results from present study; data taken on GE x-ray diffractometer with  $CrK\alpha$  radiation; s=strong; m=medium; w=weak; v=very. Additional weak lines at smaller d-spacings are found in published data from references (2) and (3).

that of  $\mathrm{Li_3AlN_2}$  and the other members of an isomorphous series (6) formed by substitutions for  $\mathrm{Al}^{3+}$  and for  $\mathrm{N}^{3-}$ . Since the structures of these compounds are based on an anti-CaF<sub>2</sub> lattice (i.e.,  $\mathrm{N}^{3-}$  in Ca<sup>2+</sup> sites), compression along <111> could result in a layer lattice of hexagonal symmetry with layers of close-packed  $\mathrm{N}^{3-}$  ions perpendicular to the hexagonal "c" axis.

The lath-like morphology of this form is best developed between 1000°C and 1400°C above 40 kb. Quenched runs from the liquid region above the melting curve of the high pressure form are characterized by fine-grained clusters of equant crystals, and the x-ray patterns differ somewhat in peak intensity from those of crystals quenched from the stability region of the phase. These differences appear to be related to a more random orientation obtained when preparing an x-ray slide with the material quenched from the liquid.

 $\text{Li}_3\text{BN}_2(W)$  is also markedly less soluble in water at room temperature than the low pressure form.

## Results and Discussion

## General

Our interpretation of the results is summarized in the P-T representation of Fig. 2 in which a large area of stability of  $\text{Li}_3\text{BN}_2(W)$  exists. Some aspects of this interpretation need amplification.

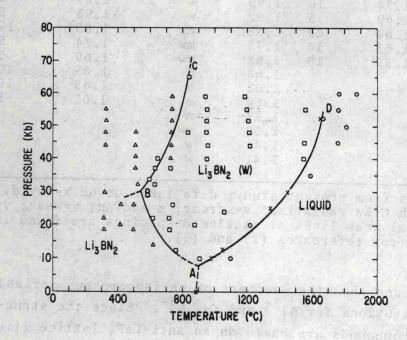


FIG. 2
P-T Diagram for the System Li3BN2 Quench data indicated by 4,0,0; thermal analysis data by x

A clean separation of a homogeneous sample from the center of a cell in which a temperature gradient existed was sometimes difficult to obtain. Particularly near the P-T conditions where