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Short Communications

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Manganese diboride. By IRA BINDER, *Union Carbide Company, White Plains, N. Y.* and BEN POST, *Polytechnic Institute of Brooklyn, Brooklyn, N. Y., U.S.A.*

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Kiessling (1950) investigated the Mn/B system and described a number of manganese borides ranging in composition from Mn_4B to Mn_3B_4. Specimens were prepared by heating mixtures of metal and boron in evacuated silica tubes at 1100–1200 °C. No evidence was found for the existence of MnB_2 or other phases with higher boron content. We have also been unable to prepare the diboride under the conditions described above. However, MnB_2 is formed readily when the reaction temperature is raised to 1400–1500 °C. The product often contains considerable Mn_3B_4 in addition to the diboride. Relatively pure diboride can be prepared conveniently by using 3 to 4 or more parts of boron to one of manganese in the reaction mixture and then removing the excess boron from the product by flotation. No lines due to Mn_3B_4, or other phases, were detected in heavily exposed X-ray diffraction patterns of specimens prepared in this way.

Table 1. *Powder diffraction data*: MnB_2
(Filtered Cu K radiation)

d (Å)	I/I_0	HKL
3·03	25	001
2·60	85	100
1·975	100	101
1·517	8	002
1·503	25	110
1·347	13	111
1·311	15	102
1·302	8	200
1·196	20	201
1·068	18	112
0·984	10	202/210
0·943	10	103
0·936	15	211
0·868	8	300
0·839	5	113
0·834	5	301
0·826	12	212
0·799	10	203

MnB_2 has the AlB_2 type structure; it is isomorphous with TiB_2, VB_2, CrB_2, and other transition metal diborides. The unit cell is hexagonal with $a = 3{\cdot}007$ and $c = 3{\cdot}037$ Å, both $\pm 0{\cdot}002$ Å. Powder diffraction data, obtained with a diffractometer using filtered Cu radiation, are listed in Table 1.

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