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14 Å spacings in kaolin minerals.

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Honjo, Kitamura & Mihama (1954) have reported a kaolin-type mineral with a period of 14 Å, as shown by electron-diffraction and X-ray examination. In a study of the phases formed on firing and on rehydrating dickite the present author found that while X-ray photographs of single crystals and powders of natural dickite from Ouray, Colorado, showed no spacing greater than 7 Å, those of dickite fired at 700° C. showed 14 Å spacings with no higher orders. For dickite which had been fired at 700° C. and subsequently rehydrated in saturated steam at 200° C. for 54 hr. there were, in addition, higher orders at 7·15 Å and 3·57 Å.

The structure postulated for dickite has a period of 14 Å owing to the superposition in the *c* direction of kaolinite units with alternate shifts of $+b_0/6$ and $-b_0/6$ in the *b* direction. In kaolinite itself, according to Brindley & Robinson (1946), these alternate shifts do not occur. No (00*l*) spacings are observed in X-ray diffraction patterns of kaolinites fired above 500° C.; the difference in behaviour of these very similar minerals is evidently due to the different manner of stacking in the *c* direction.

It is possible that the minerals reported by Honjo *et al.* were formed from dickite by natural processes similar to the heating and rehydration described above.

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Note on the structure of dimethylamine–boron trifluoride.

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Some time ago, we reported on work carried out at Cornell University on dimethylamine–boron trifluoride (Geller & Milberg, 1951). At the time this work was under way, there had not yet been developed a statistical technique for determining the presence or absence of a symmetry center in a crystal. After intensive study, it was concluded that the crystal most probably belonged to space group *Pc* despite the absence of reflections (0*k*0) with *k* odd, of which only four were within the range of observation, as well as the absence of a measurable pyroelectric effect. The crystals, however, were very poor and somewhat deliquescent. No attempt has as yet been made to solve the structure on the *Pc* basis.

At the time the Hauptman & Karle 'solution to the phase problem' was proposed (Hauptman & Karle, 1953*a*) it occurred to the writer that it would be a good idea to reconsider the case of dimethylamine–boron trifluoride, including the possibility that the space group is indeed $P2_1/c$. It was felt that if the latter were the case, this structure would be a good test of the Hauptman–Karle method. With this in mind, the values of $|E|^2$, $|E^2-1|$, and $|E|$ were computed (see Hauptman & Karle, 1953*a*). Hauptman & Karle, in private communication, pointed out tests for presence or absence of symmetry centers. These tests are readily derivable from probability distributions of structure factor magnitude which they have developed for both the centrosymmetric and non-centrosymmetric cases (Hauptman & Karle, 1953*a*, *b*). The values obtained are shown in Table 1.

The results indicate quite conclusively that the dimethylamine–boron trifluoride is non-centrosymmetric. The larger class of absences (*h*0*l*), *l* odd, leads to *Pc* as the most probable space group with two $(H_3C)_2HN–BF_3$ molecules in the asymmetric unit.

The author wishes to thank Drs Hauptman and Karle for their cooperation and Miss Francis E. Maier, who carried out much of the laborious computation.

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Table 1

Case	$< \|E\| >$	$< \|E\|^2 >$	$< \|E^2-1\| >$
Centrosymmetric	0·798 $\{\sqrt{(2/\pi)}\}$	1·000	0·968 $\{4/\sqrt{(2\pi e)}\}$
Non-centrosymmetric	0·886 $\{\frac{1}{2}\sqrt{\pi}\}$	1·000	0·736 $\{2/e\}$
$(H_3C)_2HN–BF_3$	0·786	1·00	0·657