SHORT COMMUNICATIONS

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Sidestepping of multiple-chain lamellae in grunerite asbestos

IN a previous paper (Whittaker *et al.*, 1981) we described our observations on termination and side-stepping of multiple-chain lamellae in grunerite asbestos. By modelling the side-stepping of multiple *I*-beam lamellae using cardboard cutouts we concluded that two mechanisms for such side-stepping seemed to be possible, though we had observed only one of these and the same one had also been observed in anthophyllite by Veblen and Buseck (1980). In this note we report the observation of the second mechanism and also a variant of it.

In the previously observed side-stepping mechanism (Whittaker *et al.*, 1981, figs. 15 and 16) the multiple *I*-beams are off-set along a (110) plane and the diagonal plane of multiple *I*-beams is flanked on each side by a row of holes. The second mechanism (fig. 17) leads to a displacement along a (130) plane. It produces a single row of holes, one per displaced *I*-beam instead of two as in the case of side-stepping on (110). For triple *I*-beams the volume of holes for a given displacement is larger for side-stepping on (110) than on (130), though with the second type the volume of holes increases with the width of the multiple *I*-beams involved and becomes greater than on (110) for quintuple (and wider) *I*-beams. One might therefore have expected that for triple *I*-beams side-stepping on (130) would be the more stable arrangement, though its rarity does not seem to bear out this idea.

Figure 1 is a transmission electron micrograph taken with the electron beam parallel to the *c*-axis of a sample of grunerite asbestos (amosite) from Penge, Transvaal. The main feature of interest is a side-stepping quintuple lamella, to the right of the picture. At its lower end it terminates incoherently into three double lamellae, as modelled in Whittaker *et al.*, 1981, fig. 11. The wide lamella runs parallel to (010) and then it side-steps following two different trends, as modelled in fig. 2. First it undergoes two displacements along (130), producing two large holes. The next *I*-beam up is undisplaced and the following one is displaced along (130) and the arrangement of this pair is repeated, producing an overall displacement along a (150) plane for this second section, which is accompanied by alternate large and normal-sized (for a quintuple chain) holes. Beyond this the quintuple lamella continues upwards along (010) without further deviation until near the top of the picture where it gives rise to a row of holes lying on (110). The micrograph is somewhat confused above this, but the most reasonable interpretation seems to be that shown in fig. 2. The quintuple lamella dissociates into a triple lamella and a double lamella, but the termination is rendered coherent by a cooperative conversion of two double lamellae into a quadruple lamella at the other end of the row of holes on (110).

Figure 1 also shows another feature of interest. At the lower left of the field is a short quintuple lamella which terminates incoherently at both ends into three double lamellae. The disturbance of the structure in the *b* direction at the upper termination can be seen to cancel the corresponding disturbance of opposite sense due to the incoherent termination at the lower end of the quintuple lamella at the right. It may also be deduced that the disturbance in the *c* direction due to these two terminations will cancel in the same way.

REFERENCES

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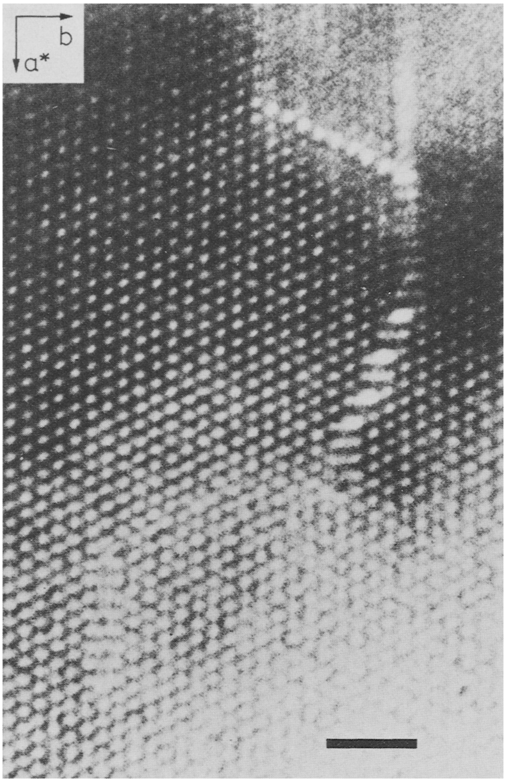

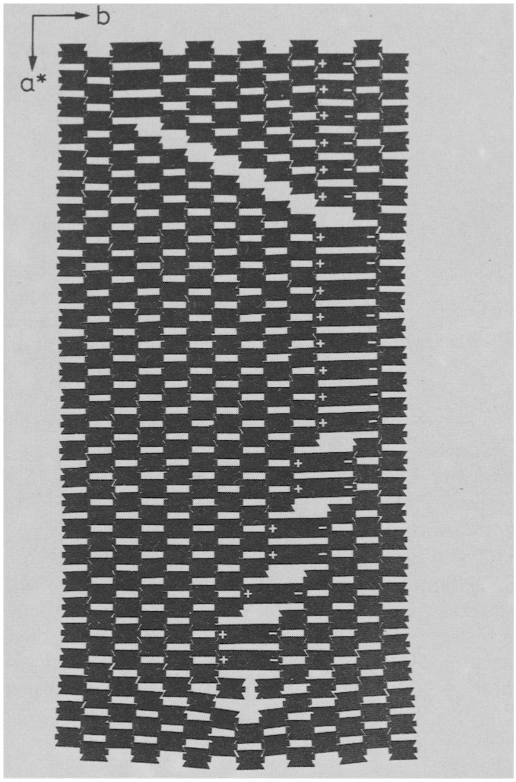

FIGS. 1 and 2. FIG. 1 (*left*). Electron micrograph of grunerite asbestos down the *c*-axis. A quintuple lamella to the right of the figure side-steps along (150) and (130) planes, and terminates incoherently at its lower end into three double lamellae. At its upper end the quintuple lamella probably dissociates in the manner shown in fig. 2. Scale bar = 50 Å. FIG. 2 (*right*). Model of the structure in fig. 1. Note that the structure on opposite sides of the odd-multiple lamellae is displaced by $c/2$.

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The occurrence of cebollite in kimberlite and included zeolitized crustal xenoliths—a correction and discussion of the occurrence of pectolite

IN a previous report (Kruger, 1980) I described two parageneses of a fibrous, radiating, colourless to red-brownish mineral with moderate birefringence, parallel extinction, and length-slow character from the Letseng-La-Terae kimberlite in Lesotho and the De Beers mine in Kimberley. I concluded the mineral was cebollite in view of a close fit of some seventeen lines determined from Debye-Sherrer diffraction photographs and the available optical data.

A microprobe analysis of the mineral is now available which shows it to have distinctly different