Tabelle 3.

	A 1-Typ (Kupfer)	A 2-Typ (α-Wolfram)	A 4-Typ (Diamant)	A 15-Typ (β-Wolfram)
0 (mod 8)	× × × × ×	× × × × ×	× × × × ×	× . × . ×
1 (mod 8)	. . . . .	. . . . .	. . . . .	. . . . .
2 (mod 8)	. . . . .	× × × × ×	. . . . .	. . . . .
3 (mod 8)	× × × × ×	. . . . .	× × × × ×	. . . . .
4 (mod 8)	× × × − ×	× × × − ×	. . . − .	× × × − ×
5 (mod 8)	. . . . .	. . . . .	. . . . .	× × × × ×
6 (mod 8)	. . . . .	× × × × ×	. . . . .	× × × × ×
7 (mod 8)	− − − − −	− − − − −	− − − − −	− − − − −

Zeichenerklärungen:

bei × : $S = F_A$

. : $S = 0$

− = unmöglicher Σh_ν^2-Wert.

	B 1-Typ (Kochsalz)	B 2-Typ (Caesiumchlorid)	B 3-Typ (Zinkblende)
0 (mod 8)	× × × × ×	× × × × ×	× × × × ×
1 (mod 8)	. . . . .	○ ○ ○ ○ ○	. . . . .
2 (mod 8)	. . . . .	× × × × ×	. . . . .
3 (mod 8)	○ ○ ○ ○ ○	○ ○ ○ ○ ○	× × × × ×
4 (mod 8)	× × × − ×	× × × − ×	○ ○ ○ − ○
5 (mod 8)	. . . . .	○ ○ ○ ○ ○	. . . . .
6 (mod 8)	. . . . .	× × × × ×	. . . . .
7 (mod 8)	− − − − −	− − − − −	− − − − −

Zeichenerklärungen:

bei × : $S = F_A + F_B$

○ : $S = F_A - F_B$

. : $S = 0$.

	C 1-Typ (Flussspat)	C 3-Typ (Cuprit)
0 (mod 8)	× × × × ×	× × × × ×
1 (mod 8)	. . . . .	. . . . .
2 (mod 8)	. . . . .	v v v v v
3 (mod 8)	v v v v v	+ + + + +
4 (mod 8)	○ ○ ○ − ○	○ ○ ○ − ○
5 (mod 8)	. . . . .	. . . . .
6 (mod 8)	. . . . .	v v v v v
7 (mod 8)	− − − − −	− − − − −

Zeichenerklärungen:

bei × : $S = F_A + 2F_B$

○ : $S = F_A - 2F_B$

v : $S = F_A$

+ : $S = 2F_B$

. : $S = 0$.

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The measurement of small differences between lattice spacings of two solid solutions.

By E. G. Steward,
Research Laboratories of the General Electric Company Limited, Wembley, England

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Sometimes it is important to measure very small differences in lattice spacings between two solid solutions, for example in determining the difference in composition between two close members of a series. Usually Debye-Scherrer photographs are taken of the two solid solutions (*A* and *B*), and the differences in spacings deduced from the line shifts.

The sensitivity of this method has, of course, a limit—and this limit is dependent on many factors, among the most important of which is the overall accuracy of the measurements made on the films. To increase the sensitivity, a method is suggested here for reducing the number of these measurements.

In this method, both diffraction patterns are obtained on one film and the slight displacement between pairs of reflexions at high angles becomes manifest as a line-broadening effect. This is measurable with a microphotometer in the usual way and can easily be converted into a lattice-spacing difference.

In practice, photographs are taken of solid solution *A*, solid solution *B*, and of a mixture containing equal amounts of *A* and *B*. Microphotometer traces of, for example, the α_1, α_2 doublet of the highest Bragg angle recorded in the composition range under examination are obtained for each film. These give, in the first two cases, the 'control' line breadths under the given experimental conditions; from these and the third microphotometer trace, the broadening due to the difference in lattice spacing can be determined.

Fig. 1 illustrates a simple example of the method in which *A* and *B* are of the same crystal size. Only one diffraction pattern and trace of these is shown therefore, together with the pattern and trace obtained from the mixture $A + B$. The lattice-spacing difference between the doublets in the example given is 0·0003 A.

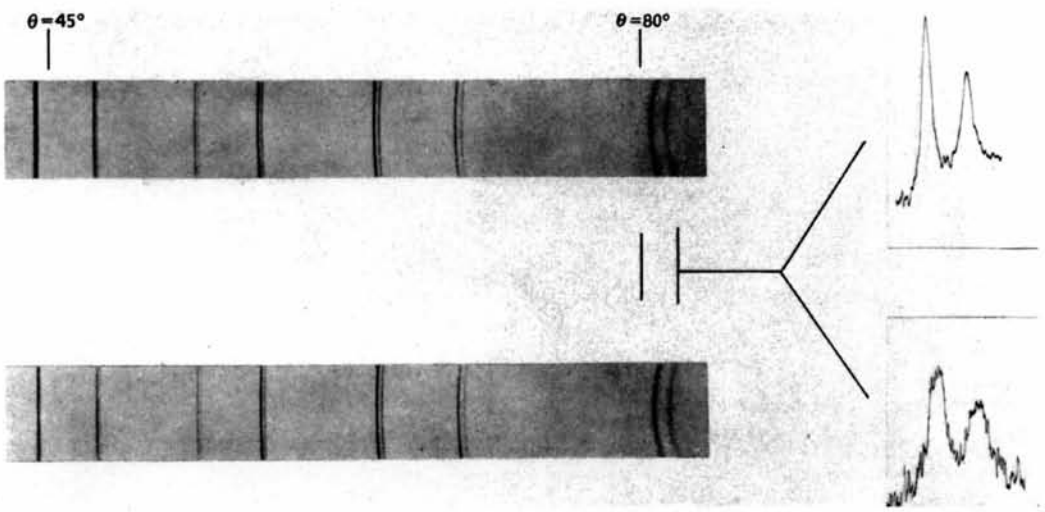

Fig. 1. Diffraction patterns and microphotometer traces of solid solutions. Above, A (or B); below, $A+B$.

[*To face p.* 339