

LETTER

*The Study of the Smoke of CdCl₂
and CdBr₂ by Means of Electron
Microscope*

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In the course of the study of the smoke of a metal halide by means of the electron microscope¹⁾, it was found that the smoke of CdCl₂ and CdBr₂ was made up of very thin, and hexagonal flakes. In this experiment the smoke of each cadmium halide was prepared by heating the substance in a porcelain crucible at about 800°–900°C. On heating, the substance melted at first, and then evaporated gradually in a white smoke. The smoke thus produced was deposited directly on a bronze wire screen (diameter; 0.5 mm), and was observed in the electron microscope.

Fig. 1 is the micrograph of the smoke of CdCl₂, and Fig. 2 that of CdBr₂. Both photographs reveal thin, flaky, and hexagonal crystals. The diffraction patterns of these flaky crystals were also obtained by employing the U-6 type three stage electron microscope. These flaky crystals give electron diffraction patterns as of Fig. 3(b) and 4(b). Fig. 3(b) shows the electron diffraction pattern caused by transmission nearly perpendicular to a portion of the flaky crystal of CdCl₂, the portion of which is indicated in the rectangle in Fig. 3(a). The electron diffraction pattern for CdBr₂ is shown in Fig.

4(b), and the portion of the crystal subjected to the electron diffraction is shown in the rectangle in Fig. 4(a).

The spacings for the substances are calculated from the N-pattern diagrams obtained here and are shown in Table 1, and it is confirmed that these flakes are CdCl₂ and CdBr₂. In addition, because of the hexad symmetry appearing in the N-pattern, it is evident that the electron beam is nearly perpendicular to the (III)-plane.

CdCl₂ and CdBr₂ have the typical layer structure and each layer is parallel to the (III)-plane, hence it is concluded that the flake in the present micrographs is formed as a result of the layer formation of crystals with the layer structure.

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Table 1²⁾

<i>d</i> _{obs.}	<i>d</i> _{x-ray.}	hkl	substance
1.93	1.93	110	CdCl ₂
1.98	1.98	110	CdBr ₂

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1) S. Suzuki, This Bulletin **25**, 279 (1952).

2) S. Yamaguchi, This Bulletin **18**, 81 (1943).