scattering, are superposed on the singly-scattered intensities; and since the variation of the background intensities with scattering angle is in general moderate, the decrease of the total intensity with scattering angles is not so rapid as in the case of diffraction by gas molecules. Thus, the s^1, or approximately s^1, sector is useful in the electron-diffraction study of solid and liquid substances.

We can suggest here that another double circular-disc sector, as shown in Fig. 1(b) may be useful for samples for which the intensity decrease is more rapid than inverse s^1. The discs A and A' touch at O, the centre of rotation. The aperture θ_r of the sector as the function of r, is shown in Fig. 3 in comparison with those for the s^1 and s^2 sectors. The double circular-disc sector of this type approximates to the s^1 sector at small values of r and to the s^2 sector at large values of r.

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Crystallographic properties of diammonium phosphate, (NH4)2HPO4.

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A rapidly growing interest in diammonium phosphate as a nitrogen–phosphorus fertilizer material prompted a study of its crystallographic properties, which were but partly described in the literature.

Diammonium phosphate forms colorless monoclinic crystals, holohedral class 2/m. Crystals from the system NH_3–H_3PO_4–H_2O usually are tabular to platy on (001), the common forms being {001}, {110} and {$\bar{1}$01}. The presence of nitrate ion causes elongation along b to produce blade-like crystals. Sulfate ion causes thickening along c to produce equant, distorted bipyramids, the forms {001}, {110} and {$\bar{1}$01} being equally developed. The presence of ferrocyanide ion along with sulfate ion similarly causes thickening along c to give equant crystals but changes the habit to parallelepipedons with equally developed {001} and {110}, sometimes modified by prominent {$\bar{2}$01}. Certain aliphatic surfactants introduce strain, with resultant warping of the tabular crystals on (001).

The crystals are biaxial positive, $2V = 80$–$85°$ (calc. = 85°),

$$N_\alpha = 1\cdot508, \quad N_\beta = 1\cdot518, \quad N_\gamma = 1\cdot530,$$

$Bx_a = Z = b$, and $X \wedge a = 43\cdot5°$ in acute β. Interfacial angle measurements yield $\beta = 113\cdot5°$. No dispersion was observed.

Rotation and Weissenberg photographs (Cu $K\alpha$, $\lambda = 1\cdot54$ Å) show the unit cell to be monoclinic with the dimensions

$$a = 8\cdot03, \quad b = 6\cdot68, \quad c = 11\cdot02 \text{ Å}, \quad \beta = 113° 38'.$$

The only systematic absences apparently are $h0l$ with h odd and $0k0$ with k odd. The most probable space group is C_{2h}^5–$P2_1/a$. With $4[(NH_4)_2HPO_4]$ per unit cell, the calculated specific gravity, $1\cdot61$, agrees quite well with the value $1\cdot62$ reported by Schiff (1859) and the value $1\cdot60$ calculated from refractive indices through the Gladstone–Dale relationship (Larsen & Berman, 1934).

The comparison in Table 1 shows that the X-ray data

Table 1. *Comparison of X-ray and optical goniometric results*

$a : b : c$	X-ray 1·2021 : 1 : 1·6497	Mitscherlich 1·1981 : 1 : 1·6546	Brooke —
(100) $\wedge$ (00$\bar{1}$)	113° 38'	113° 14'	—
(110) $\wedge$ (1$\bar{1}$0)	95° 23'	95° 30'	95° 45'
(110) $\wedge$ (001)	74° 20'	74° 37'	74° 10'
($\bar{1}$01) $\wedge$ (001)	70° 21'	70° 16'	70° 28'

yield axial ratios and interfacial angles in good agreement with the optical goniometric data of Mitscherlich and of Brooke as reported by Groth (1908).

The powder diffraction pattern reported by Hanawalt, Rinn & Frevel (1938) is suitable as a means of identification, although these authors listed only the stronger lines.

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