

isotypic, and diadochic substitution of Cu, Zn and Co is possible. The MgSO_4 and NiSO_4 form another structure type (Dimaras, 1957, and Rentzeperis and Soldatos, 1958).

At the International Mineralogical Association meeting at Copenhagen in 1960, it was agreed to use the spelling "chalcokyanite." The crystallographic orientation is that of Scacchi (1873) with *a* halved.

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THE OCCURRENCE OF CUSPIDINE IN PHOSPHORUS FURNACE SLAG

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Cuspidine ($3\text{CaO}\cdot\text{CaF}_2\cdot 2\text{SiO}_2$) is a rare natural mineral which was first described by Scacchi.¹ Since that time the mineral has been synthesized by solid state reaction,² from melts³ and hydrothermally.⁴ It has also been observed as a constituent of electric welding slags.⁵

In the present investigation, three types of slag which came from furnaces fed with fluorine containing phosphate rock were examined. The first type was one which had a normal silica/lime ratio of 0.85, the second type was one which had been cooled slowly ($1300^\circ\text{C}.$ — $100^\circ\text{C}.$ in 35 hours) and which had a low silica/lime ratio of 0.67, the third type was the same as type 2 but the cooling was carried out in six hours. On examination, all three types were found to contain up to 35% of cuspidine. Fig. 1 shows the spear shaped crystals which are characteristic of the compound.

ANALYSIS

It was possible to pick out small quantities of cuspidine crystals from the crushed slags and these were examined optically and by means of x-rays.

X-RAY EXAMINATION

Cell dimensions and the space group were determined from a single crystal of cuspidine. The values obtained have been compared with those of Smirnova, Rumanova and Belov.⁶

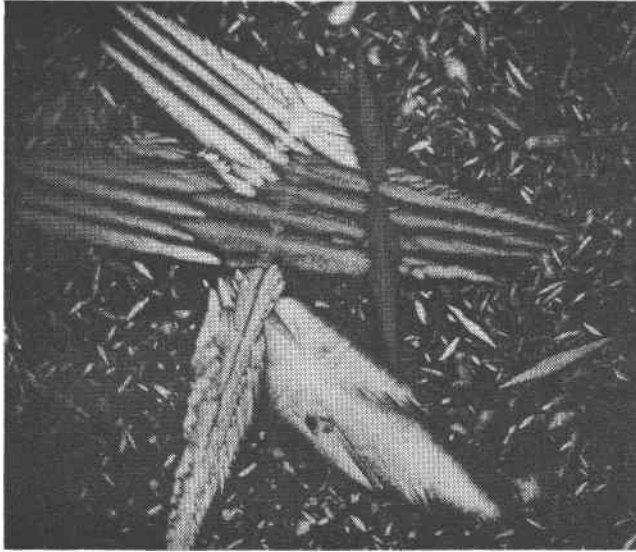


FIG. 1. Slag with silica/lime ratio of 0.67. Cooled in six hours to give a glassy matrix with skeletal phenocrysts of cuspidine. Crossed nicols. $\times 35$.

Powder photographs were also taken and the d values of the interplanar spacings were measured. These values check very closely with natural cuspidine and synthetic cuspidine.

OPTICAL PROPERTIES

Measurements were only made on material obtained from a normal slag with silica/lime=0.85. The crystals are biaxial positive with the following values: $\alpha=1.590$, $\beta=1.593$, $\gamma=1.602 \pm 0.002$, $2V$ (measured) = 58° , optical axial plane (010), twinning plane (001), extinction angle $X \wedge a = 7^\circ$, cleavage plane (110)—poor. The refractive indices and extinction angle agree with values given by Valkenburg and Rynders⁴ but the $2V$ angle reported here is lower. However, their $2V$ angle is an estimated value and it is found that our results agree closely with those published elsewhere.⁷

TABLE 1. COMPARISON OF SINGLE CRYSTAL X-RAY DATA

	$a_0(\text{\AA})$	$b_0(\text{\AA})$	$c_0(\text{\AA})$	β	Z	$\rho \text{ g/cm}^{-3}$
Present work	7.57	10.57	10.93	$69^\circ 53'$	3.98	2.95
Results from Ref. 6	7.54	10.43	10.85	$69^\circ 56'$	3.84	2.97-2.99

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THE STABILITY OF THE ARSENIC TRIBROMIDE IMMERSION
LIQUIDS DURING STORAGE*

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It is now 10 years since the first complete series of immersion liquids of high index of refraction (1.74–2.00) suitable for routine use was proposed (Meyrowitz and Larsen, Jr., 1951). A set of the liquids, in clear glass bottles with ground-glass stoppers and ground-glass dust covers, has been stored in a dark cupboard continuously. During this 10-year interval, the bottles were opened only a few times either to determine the index of refraction of the contained liquid or to transfer the liquid to a new glass bottle after the liquid had been filtered.

The liquids were filtered twice: first, after their indices of refraction were measured when they were 6 months old, and second, before they measured when they were 10 years old. When the liquids were 6 months old, some of the liquids had developed a slight turbidity and crystals of sulfur were present in the 1.98, 1.99, and 2.00 liquids. The liquids containing methylene iodide, sulfur, and arsenic tribromide ($n=1.74-1.81$) were originally yellow amber and became slightly darker at the end of 6 months. Now, at the end of 10 years, they are purple brown. The liquids containing arsenic disulfide ($n=1.82-2.00$) were originally yellow amber to dark amber and at the end of 10 years are slightly darker.

The liquids at the end of 10 years contained no large crystals. Some had a small amount of fine precipitate but the liquids were otherwise transparent and suitable for use. The inside surface of the glass bottles appeared to be cloudy as if they had been etched by the liquids or as if a fine deposit had formed on the inside surface of the bottle.

Table 1 gives the original indices of refraction of the liquids and their

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