should be specified and checked at the time of purchase—it is that the
two plates (the usual accessory mica plate of 155 m\(\mu\) retardation and the
substage Benford plate) have equal retardation. The manufacturer must
allow himself some tolerance from the stated 155 m\(\mu\) value of the plates
but can select pairs of matched plates for use with this method of inter-
ference figure analysis. The tolerance does not ordinarily come to the
attention of the operator in routine work but it is quite noticeable in the
use of the two plates and leads to two sources of error:

1. If the two plates are of slightly different retardation 2\(D\) is of dif-
ferent value when measured in two positions which are 90° apart ob-
tained by rotating the micrometer ocular. Neither value is correct.
This provides the simplest method to test the equipment for matching
plates, using a muscovite mount (2\(V\) = 44°) on the stage and a 4 mm.
N.A. 0.85 objective. The absolute retardation of the plates is of no con-
cern, merely that they are selected to agree.

2. When one is observing dispersion, this effect can modify the dis-
tribution of the color fringes, leading to an incorrect determination of the
crystal system and orientation. If, however, the plates are well matched,
observations of dispersions in interference figures is both more sensitive
and more precise than is possible by the conventional method.

This technique has been in satisfactory classroom use for several
years at the University of Wisconsin.

THE AMERICAN MINERALOGIST, VOL. 46, MAY-JUNE, 1961

THE CHALCOKYANITE SERIES

H. STRUNZ, Berlin, Germany.

Some important earlier results on the chalcokyanite series were not
reported in the paper of Pistorius (1960). These additional results are:

<table>
<thead>
<tr>
<th>Chalcokyanite</th>
<th>CuSO(_4)</th>
<th>(Pmn_b)</th>
<th>(Z = 4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kokkoros and Rentzeperis (1958)</td>
<td></td>
<td>(a_0 = 6.69\ \AA, b_0 = 8.39\ \AA, c_0 = 4.83\ \AA)</td>
<td>(a:b:c = 0.797:1:0.576)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Zinkesite</th>
<th>ZnSO(_4)</th>
<th>(Pmn_b)</th>
<th>(Z = 4)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>(a_0 = 6.74\ \AA, b_0 = 8.60\ \AA, c_0 = 4.77\ \AA)</td>
<td>(a:b:c = 0.784:1:0.555)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Synthetic</th>
<th>CoSO(_4)</th>
<th>(Pmn_b)</th>
<th>(Z = 4)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>(a_0 = 6.72\ \AA, b_0 = 8.47\ \AA, c_0 = 4.66\ \AA)</td>
<td>(a:b:c = 0.793:1:0.550)</td>
</tr>
</tbody>
</table>

Full structure determinations for CuSO\(_4\) and ZnSO\(_4\) are given by
Kokkoros and Rentzeperis (1958). The Cu, Zn and Co sulfates are
isotypic, and diadochic substitution of Cu, Zn and Co is possible. The MgSO₄ and NiSO₄ 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 "chalcopyrite." The crystallographic orientation is that of Scacchi (1873) with a halved.

References

Schiff, K. (1934), Z. Krist., 87, 379.

THE AMERICAN MINERALOGIST, VOL. 46, MAY–JUNE, 1961

THE OCCURRENCE OF CUSPIDINE IN PHOSPHORUS FURNACE SLAG

A. Wilson and J. K. Leary, Oldbury, Birmingham.

Cuspidine (3CaO·CaF₂·2SiO₂) is a rare natural mineral which was first described by Scacchi. Since that time the mineral has been synthesized by solid state reaction, from melts and hydrothermally. It has also been observed as a constituent of electric welding slags.

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°C–100°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.