coexisting with FeS varies in composition from 47.8 atomic % metals at 20 °C to 48.5 atomic % metals at 100 °C. Monoclinic $Fe_{1-x}S$ is stable up to approximately 310 °C. Hexagonal $Fe_{1-x}S$ inverts to monoclinic $Fe_{1-x}S$ in less than 60 days at 305 °C.

CRYSTALLOGRAPHY OF HATCHITE

L. G. BERRY
Queen's University, Kingston, Ont.

One crystal of hatchite, from the British Museum collections, corresponding to figure 1 in the original description by Solly and Smith (1912), is triclinic, with lattice dimensions $a = 7.71$, $b = 7.92$, $c = 9.13$ Å, $\alpha = 116°31$, $\beta = 85°55'$, $\gamma = 112°57'$, $a:b:c = 0.973:1:1.153$ in reasonable agreement with the morphological data. The least oblique cell in the normal setting, with $a = 7.92$, $b = 9.03$, $c = 7.71$ Å, $\alpha = 105°40'$, $\beta = 112°57'$, $\gamma = 64°48'$ is related to the morphological setting by the matrix (old to new) 010/011/100.

SUBSOLIDUS STUDIES IN THE ZnS–FeS–FeS_2 SYSTEM

R. S. BOORMAN
New Brunswick Research and Productivity Council, Fredericton, N.B.

The sluggish nature, measured in periods up to twelve months, of solid state reactions in the Zn-Fe-S system has hampered the low temperature phase studies of earlier workers. New techniques were devised involving special starting material preparation and fluxing which made it possible to grow (Zn, Fe)S crystals in equilibrium with pyrrhotite and pyrite in less than a week at 400 °C. The sphalerite solvus in the ZnS-FeS-FeS_2 system was investigated from 714 °C to a new low temperature of 303 °C. The results of this study differ from those of Kullerud (1953), but are in excellent agreement with the Barton & Toulmin (1963) data over their range of experimentation, (743 °C – 580 °C).

After reaching a FeS composition maximum at 580 °C, the sphalerite solvus drops vertically at a constant composition of approximately 21 mole per cent FeS to the hexagonal-monoclinic pyrrhotite inversion temperature. It does not bend towards 0 mole per cent FeS at 0 °C as postulated by Barton & Toulmin. At 303 °C hexagonal pyrrhotite, pyrite and sphalerite constitute the equilibrium assemblage on the sphalerite solvus. Monoclinic pyrrhotite was present in runs at 210 °C.

Preliminary studies indicate that (Zn, Fe)S crystals, synthesized in equilibrium with monoclinic pyrrhotite and pyrite, have a higher FeS content than do sphalerites in equilibrium with hexagonal pyrrhotite and pyrite, synthesized immediately above the pyrrhotite inversion temperature.

INDIUM IN CO-EXISTING MINERALS FROM THE MOUNT PLEASANT TIN DEPOSIT

R. S. BOORMAN AND D. ABBOTT
New Brunswick Research and Productivity Council, Fredericton, N.B.

At Mount Pleasant 2.1, 1.18, 0.19, 0.11 and 0.04 weight per cent indium was determined by electron microprobe analyses in the co-existing sulphides isostannite, sphalerite, chalcopyrite, chalcocite and hexastannite respectively. The associated cassiterite contains a maximum of 0.03 weight per cent indium. Although high indium values are characteristic of certain sulphide minerals from the cassiterite-sulphide-silicate type of tin deposit, at Mount Pleasant the indium contents are larger than previously recorded for this type of mineralization.

Isostannite and chalcopyrite have derivative structures of sphalerite which, like the latter, are based on metal atoms in tetrahedral co-ordination with sulphur. The similarity of the metal-sulphur bonds (2.32–2.43 angstroms) and the indium-sulphur bond (2.53 angstroms) might be an important control on indium substitution.