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G. Yu. IVANYUK.\*\* THE CRYSTAL STRUCTURE OF EPIFANOVITE

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The crystal structure of epifanovite,  $\text{NaCaCu}_5(\text{PO}_4)_4[\text{AsO}_2(\text{OH})_2] \cdot 7\text{H}_2\text{O}$ , a new mineral from the oxidation zone of the Kester tin deposit, was determined by direct methods and refined to  $R_1 = 0.087$  on the basis of 2147 independent observed reflections. The mineral is monoclinic,  $P2_1/m$ ,  $a = 9.6911(8)$ ,  $b = 9.7547(9)$ ,  $c = 9.9632(14)$  Å,  $\beta = 102.237(10)^\circ$ ,  $V = 920.46(17)$  Å<sup>3</sup>,  $Z = 2$ . The crystal structure of epifanovite contains four symmetrically independent Cu sites, each coordinated by five O atoms by forming short equatorial (1.905—1.964 Å) and one elongated (2.467—2.720 Å) Cu—O bonds. Four  $\text{CuO}_5$  pyramids centered by the Cu<sub>2</sub>, Cu<sub>3</sub> and Cu<sub>4</sub> sites are linked at the O<sub>11</sub> atom to form  $[\text{Cu}_4\text{O}_{13}]$  tetramers. The  $[\text{Cu}_4\text{O}_{13}]$  tetramers and Cu<sub>1</sub>O<sub>5</sub> pyramids are linked via phosphate groups into the complex, which is incrustated by disordered  $[\text{AsO}_2(\text{OH})_2]^-$  group to form fundamental building blocks in the structure. The blocks are linked through phosphate groups to form layers parallel to the (001) plane. The layers are joined into a three-dimensional framework by sharing of the apical atoms of the Cu<sub>1</sub>O<sub>5</sub> pyramids and O atoms of disordered arsenate groups. Epifanovite is related to the group of minerals and inorganic compounds based upon the  $[\text{Cu}_4\text{O}(\text{TO}_4)_4]$  layers (T = As, P). The most closely related to epifanovite are monoclinic polytypes of the andyrobertsite-calcioandyrobertsite  $\text{KMeCu}_5(\text{AsO}_4)_4[\text{As}(\text{OH})_2\text{O}_2] \cdot 2\text{H}_2\text{O}$  ( $\text{Me} = \text{Cd}, \text{Ca}$ ).

*Key words:* epifanovite, crystal structure, disorder, copper phosphate-arsenate, Kester deposit.