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ON A NEW TYPE OF COPPER MONOFLUOROPHOSPHATE

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Salts of the monofluorophosphoric acid, H_2PO_3F, has been studied first by LANGE [1]. By the reaction of Ag_2PO_3F and $CuCl_2.2H_2O$ in aqueous solution GOSWAMI [2] has prepared a copper salt of the formula $CuPO_3F.5H_2O$.

Studying the reaction of alkali monofluorophosphates and copper(II) compounds in aqueous medium we have synthesized a basic copper potassium monofluorophosphate: $Cu_2K(OH)(PO_3F)_2.H_2O$. This new type compound has been characterized by elemental analysis, paper chromatography and its thermal decomposition. The constitution has been confirmed by crystal structure analysis. The compound crystallizes in the monoclinic space group Cm. The unit cell parameters are a=9,094(4) Å, b=6,333(3) Å, c=7,755(6) Å, β=117,55(5)° and N= 2 x $Cu_2K(OH)(PO_3F)_2.H_2O$.

A nearly isometric crystal was used for collecting the intensity data of 491 unique reflections on a Four-Circle-Diffractometer CAD-4. The structure model was derived from a Patterson synthesis and refined by full-matrix-least-squares down to a residual value of R=0,022. In a difference electron density map the three hydrogen atoms could be located.

Copper is octahedrally coordinated by oxygen atoms. Four of these six oxygen atoms belong to four different PO_3F-tetrahedra. The other two belong to the hydroxyl group and the crystal water, which are distinctly allocated to copper. Potassium is coordinated by four fluor and six oxygen atoms, which originate from different PO_3F-tetrahedra.

1 W. LANGE, Chem. Ber. 62, 793 (1929)

2 H.C. GOSWAMI, J. Ind. Chem. Soc. 14, 660 (1937)