LETTERS TO THE EDITOR

CRYSTALLIZATION AND CRYSTAL DATA OF ACETAMINOPHEN AND METAMIZOL

ACETAMINOPHEN (also known as paracetamol) and metamizol (Novalgin) are well-known pain relieving medicines. Acetaminophen is a derivative of acetanilide whereas metamizol is a pyrazole derivative. The crystallization and the preliminary X-ray study of these compounds have been carried out as part of a programme of structural investigations of analgesics and their interactions[1-3].

Large, nearly transparent crystals of acetaminophen were crystallized by slow evaporation of its solution in ethanol. Tiny, needle-like crystals of metamizol were grown by vapour diffusion with water as the solvent and ethanol as the precipitant. The space groups and the unit cell dimensions of the crystals were determined from oscillation, Weissenberg and precession photographs taken about crystallographic axes using nickel filtered copper radiation. The densities of the samples were measured by flotation method using a mixture of carbon tetrachloride and benzene. These data are given in Table I.

TABLE I
Crystal data

	Acetaminophen	Metamizol
Space group	$P2_1/c$	$P2_1/c$
a in Å	$7{\cdot}12 \pm 0{\cdot}01$	$9{\cdot}25 \pm 0{\cdot}01$
b in Å	$9{\cdot}40 \pm 0{\cdot}03$	$49{\cdot}22 \pm 0{\cdot}02$
c in Å	$12{\cdot}88 \pm 0{\cdot}03$	$7{\cdot}32 \pm 0{\cdot}02$
β in degrees	$116{\cdot}2 \pm 0{\cdot}5$	$90{\cdot}5 \pm 0{\cdot}5$
Volume of the Unit Cell in Å^3	773·50	3332·69
Molecular formula	$C_8H_9O_2N$	$C_{13}H_{16}N_3NaO_4S$
Formula weight	151·16	333·35
No. of formula weights in the unit cell	4	8
Measured density in gm/cc	$1{\cdot}294 \pm 0{\cdot}005$	$1{\cdot}388 \pm 0{\cdot}005$
Number of solvent molecules in the unit cell	..	8 H_2O
Calculated density in gm/cc	1·298	1·400

The complete structure determination of the compounds is in progress. The authors thank Prof. P. S. Narayanan for his interest in the work.

Department of Physics, Indian Institute of Science, Bangalore-560012,
T. P. SINGH.
T. N. BHAT.
M. VIJAYAN.

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ELECTRICAL PROPERTIES OF A NEW TYPE OF $A^+B^{5+}B^{6+}O_6^{2-}$ COMPOUNDS

RECENTLY[1] the structural properties of a new type of compounds with the general formula $A^+ B^{5+}B^{6+}O_6^{2-}$, where $A^+ = Na^+$, K^+, $B^{5+} = Nb^{5+}$ Ta^{5+} and $B^{6+} = Mo^{6+}$, W^{6+} have been reported. This note summarises the electrical properties of the compositions in the above systems.

The electrical properties like dielectric constant (ϵ), loss tangent (tan δ) and room temperature resistivities (both a.c. and d.c.) were measured on 12 mm diameter, 1–2 mm thickness circular pellets by the methods described earlier[2]. The results obtained are as follows:

(1) In the system $NaNbO_3$–WO_3, compositions with 20 mole% WO_3 gave values of ϵ and tan δ ranging from 25 (ϵ), 0·12% (tan δ) for pure $NaNbO_3$ to 200 (ϵ) and 0·5% (tan δ) for 20 mole% WO_3 incorporation. The compositions are ferroelectric in this region. Appearance of a columbite phase beyond 20 mole% WO_3 incorporation results in semi-conducting properties (order of the dc resistivities 10^{-5} ohm. cm). The semiconducting properties may be attributed to either (1) the Na–Na bonding resulting from the overlapping of the sodium 3p orbitals, (2) W–W or Nb–Nb bonding from the overlapping of tungsten or niobium t_{2g} orbitals or (3) covalent bonding from a mixing of the Na p orbitals and W(Nb) t_{2g} orbitals. Further work is in progress to establish the mechanism of conduction in these compositions. Beyond 35 mole WO_3 addition it was not possible to measure the dielectric constant probably due to the enhanced conduction resulting in lossy samples.

(2) In the system $NaTaO_3$–WO_3, the values of ϵ and tan δ varied from 50 (ϵ) and 0·02% (tan δ) to 500 (ϵ) and 0·12% (tan δ) as the WO_3 concentration increased. The $NaTaO_3$ phase exists upto 50 mole% incorporation of WO_3 and shows the ferroelectric properties which tend to disappear beyond 50 mole% WO_3 incorporation. A linear relationship between T_c (transition temperature)