09. STRUCTURES OF ORGANIC, ORGANOMETALLIC AND COORDINATION COMPOUNDS

09.2-10 CRYSTAL AND MOLECULAR STRUCTURE OF 4,10aS-(12-OXOCYCLOPENTAN-1'-2',3',4',4a',9,10a-OCTAHYDROPHENANTHRENE.

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The structure analysis of 4,10aS-(12-oxocyclopentane)-4-methyl-1,2,3,4,4a,9,10a-octahydrophenanthrene (C17H20O2) was undertaken to explain the physical properties of the compound and to discover the structural features of bridged ketones related to certain bioactive natural products.

The compound crystallized in space group P21/c, a = 8.158(1), b = 15.919(4), c = 9.858(2) Å, \( \beta = 99.67(2)^\circ \). V = 1374 Å³, \( D_c = 1.21 \text{ g cm}^{-3} \) for \( Z = 4 \), \( D_p = 1.25 \text{ g cm}^{-3} \), F(000) = 502, \( \mu(\text{MoK} \alpha) = 0.7017 \text{ Å}^{-1} \).

Three-dimensional diffraction data were recorded on a Nonius CAD-4 diffractometer by \( \omega-2\theta \) scans. The data comprised 2312 reflections including 641 with \( F_o \geq 4 \sigma(F_o) \). The structure was solved by direct methods, and was refined isocrystally and then anisotropically using the full-matrix least-squares program MAMIE and the block-diagonal least-squares program BLOK, respectively. The final \( R = 0.046 \). The molecular dimensions are satisfactory in comparison with those of similar compounds.

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09.2-11 CRYSTAL AND MOLECULAR STRUCTURE OF 10a-(6-HYDROXY-4AMINO-4,4'-DICHLOROACETOPHENONE.

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The crystal structure analysis of 10a-(6-hydroxy-4-amino-4,4'-dichloroacetophenone (C19H12Cl2O2) was undertaken as a part of a study of biologically important organic compounds, to explain the effect of the \(-\text{OH}, -\text{NH}_2\) and \(-\text{COCHCl}_2\) groups on the antibiotic activity of chloramphenicol. The compound crystallized in the monoclinic space group P21/c with \( a = 7.458(2), b = 9.109(1), c = 13.400(3) \) Å, \( \beta = 99.86(2)^\circ \). V = 896.9 Å³, \( D_c = 1.63 \text{ g cm}^{-3} \) for \( Z = 4 \), \( D_p = 1.65 \text{ g cm}^{-3} \), F(000) = 480, \( \mu(\text{MoK} \alpha) = 6.86 \text{ cm}^{-1} \), \( \lambda(\text{MoK} \alpha) = 0.7107 \text{ Å} \).

Three-dimensional X-ray diffraction data were recorded on a Nonius CAD-4 diffractometer by \( \omega-2\theta \) scans. The data comprised 1571 reflections including 390 with \( F_o \geq 4 \sigma(F_o) \). The structure was determined by Patterson methods. It was refined first isotropically and then anisotropically using the full-matrix least-squares program MAMIE and the block-diagonal least-squares program BLOK, respectively. The final \( R = 0.044 \). Bond parameters are satisfactory.

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09.2-12 CRYSTAL AND MOLECULAR STRUCTURE OF BANACHALONE (C31H31O6).

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As a part of our investigation of a group of chalcones we have determined the structure of the title compound. This open chain flavonoid crystallizes in the monoclinic space group P21/c with 4 molecules in unit cell of dimensions \( a = 9.561(5), b = 11.068(3), c = 17.915(5) \) Å and \( \beta = 103.26(3)^\circ \). Data were collected on a CAD-4 diffractometer with graphite-monochromated Mo K\( \alpha \) radiation. The structure was solved by direct methods and refined anisotropically by block diagonal least squares to a final \( R = 0.075 \) for 1388 reflections with \( F_o \geq 2\sigma(F_o) \).

The observed pronounced conjugation, may be responsible for the bright orange colour of the compound. An intra-molecular hydrogen bond occurs between the hydroxyl donor and the carbonyl acceptor. The molecules are linked in chains parallel to \((010)\) by fairly strong hydrogen bonding (1.58...0) - they being related by the c-glide. A noticeable feature is that the donor in the intra-molecular hydrogen bonding acts as an acceptor in the intermolecular hydrogen bonding. The 3-D hydrogen bond network that represents the main type of intermolecular interaction that stabilises the structure also apparently accounts for the somewhat high melting point.