Preliminary Communications

A New Isomer of Hexachlorocyclohexane with Zero Dipole Moment

O. PASTIANSEN and O. HASSEL

Universitetets Kjemiske Institutt, Blindern-Oslo, Norway

The determination of the molecular structure of the different benzene hexachlorides (CHCl)_6 would be of great interest, but demands a considerable amount of precise work. The only isomer the configuration of which is well established is the symmetrical β compound in which the Cl atoms have the positions x,x,x,x,x,x. Besides this substance a second isomer with zero dipole moment should exist in which the chlorine atoms 1 and 4 are in ε positions (ε,ε,ε,ε,ε,ε). It is known that the a, γ and β isomers have considerable dipole moments, the moment of the ε isomer has not been determined.

Cyclohexane and monochloro-cyclohexane were treated with gaseous chlorine under cooling but using strong artificial light until no further absorption of chlorine could be observed. From the different fractions obtained by distillation in vacuo of the reaction product some new substances were prepared. One of these is a chloride C_6H_5Cl_6 of m.p. 145°C obtained from the most volatile part of the product.

C_6H_5Cl_6
Calc. Mol. wt. 290.9 Cl 73.1
Found 285, 286 72.0, 72.5
(Cryoscopic molecular weight determination in benzene.)

Monoclinic unit cell contains 4 molecules (α = 11.1, β = 6.78, γ = 14.0; β = 98°).

The result of dielectric constant measurements of very dilute solutions in benzene and carbon tetrachloride may be expressed by the ratio \( \frac{\Delta \varepsilon}{x} \) (x being the mole fraction of hexachloride):

\[
\begin{align*}
C_6H_6 & \quad \text{CCl}_4 \\
\text{New substance:} & \quad 0.552 \quad 0.536 \quad (x \text{ ranging from 0.001 to 0.007}) \\
\beta \text{ isomer:} & \quad 0.847 \quad (x = 0.002)
\end{align*}
\]

There can be little doubt that the dipole moment is in fact zero. If we exclude the possibility (which seems very improbable) that the substance contains two CCl_2-groups and two CH_2-groups, the conclusion must be drawn that the new substance is in fact a sixth isomer in the series of benzene hexachlorides having the configuration of Cl atoms given above (ε,ε,ε,ε,ε,ε). (Small quantities of the converted, energetically less stable configuration x,x,x,x,ε,ε may occur in solution or in the vapour). We therefore propose the designation ζ benzene hexachloride for the new substance.

Preliminary experiments on insects indicate that the isomer is almost inactive as a contact poison.


Received December 20, 1947.

Note on the Cleavage of Insulin by Chymotrypsin

PEHR EDMAN

Department of Biochemistry, Carolinian Institute, Stockholm, Sweden

Crystalline insulin has been digested with crystalline chymotrypsin until the amino nitrogen was constant. The reaction