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DETERMINATION OF PURITY OF LIQUID ISOMERS BY X-RAY DIFFRACTION

G. W. STEWART

Previous contributions have been made by the writer and Professor Skinner on the isomers of primary normal alcohols and by the writer on normal paraffins. The difference between the normal compounds and isomers are shown by displacements of the chief diffraction peak in amounts indicated by increases in the mean diameter of the molecule. The diameters of the normal alcohols and of the normal paraffins have been found and published. The former diameter increases linearly 4.3\AA with propyl to 4.5\AA , n-lauryl alcohol. The values for n-methyl and ethyl are 3.8\AA and 4.2\AA respectively. With the n-paraffins the diameter is constant from pentane to tetradecane at 4.6\AA . A branch with either chain shows at once a displaced diffraction peak. As an illustration of the reliability of the method may be cited experiments with n-pentane and n-decane. These compounds were obtained from a research laboratory but were found to have diffraction peaks which were over a degree displaced from that of the normal paraffins. But later when synthetic normal compounds were obtained they were found to have diffraction peaks at the same place as the other normal paraffins. This shows that the original samples were not normal compounds. All these experiments point to the fact that the x-ray diffraction method has an important place in distinguishing between isomers and in testing the purity of chain compounds.

DIMENSIONS OF CARBON CHAINS

G. W. STEWART

There seems to be no doubt in reference to the existence of carbon chains in organic compounds, but the arrangements of the carbon atoms and the dimensions of the chains are much in doubt. In connection with x-ray diffraction in liquids it has been possible to make measurements of interest on the paraffin, the alcohol and the fatty acid chains, and these may be summarized as follows:

1. The chain widths in the three cases are almost the same, i.e. 4.6\AA .
2. The primary normal alcohols show a small but steady increase in width from a content of three to a content of eleven carbon atoms.