

Progress of bromine addition to the double bond was followed mainly by X-ray powder photographs and by following the change with time of the weight of the product layer with a Cahn Electrobalance.

We find that the different crystalline modifications of these acids behave differently towards bromination, and propose a first interpretation of our kinetic data in terms of competing reactions of complex formation between bromine and the unsaturated system and bromine addition to the  $>C=C<$  group; the formation of the complex appears to be dependent upon the crystal structure type since it occurs in the  $\beta$ -modifications only.

#### REFERENCES

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#### An X-ray investigation of the mechanochemical melting of collagen

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The three-stranded helical structure of collagen is stabilised mainly by intramolecular hydrogen bonds between the strands, whereas crosslinks of various kinds connect adjacent molecules. The characteristic X-ray fibre diagram includes an equatorial reflection at about  $14 \text{ \AA}$  in wet collagen, a meridional arc at  $2.9 \text{ \AA}$  on the 10th layer line and near-meridional reflections on the 3rd and 7th layer lines.

Under the action of heat or various salt solutions, collagen fibres contract to about 50% of their initial length with a fairly sharp "melting point", which depends on the force stretching the fibre.

Collagen melting was studied in 2.8 M aqueous KCNS solution at 25-30°C, under conditions maintaining a constant rate of contraction. The contracting force was observed to go through three successive stages during which it fell sharply, remained constant and decreased gradually to zero.

A series of X-ray photographs taken at regular intervals during the melting process showed two distinct sets of changes. Up to the end of the stage of constant force, during which the fibres contracted to about 90% of their initial length, the 3rd and 7th layer lines weakened and disappeared. Throughout the entire experiment the equatorial reflection became progressively more diffuse and the  $2.9 \text{ \AA}$  meridional arc less well oriented; both were however observed till practically the end of the melting process. These results suggest that intramolecular hydrogen bonds, which maintain the helical symmetry, are destroyed more quickly than intermolecular crosslinks, which to a considerable extent control the lengths of the molecules as well as intermolecular distances. On restretching the melted fibres most of the original X-ray pattern was restored.