

*. Liquid Crystal :-

Liquid crystals are a state of matter which has properties between those of liquids and those of solid crystals.

A liquid crystal may flow like a liquid, but its molecule may be oriented in a crystal like way.

Substances showing the above behaviour are usually some long chain organic molecules either terminating in groups such as -OR, -COOR or having groups like ~~ester~~ -C≡N, -N=NO-, -C=C- in the middle.

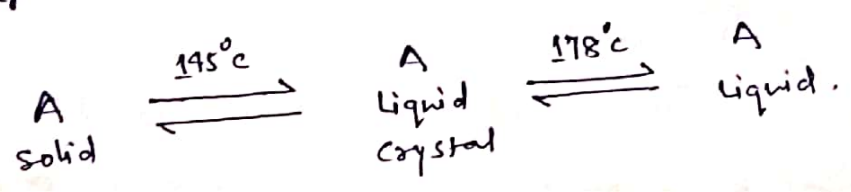
for example - cholesteryl benzoate $C_6H_5COOC_{27}H_{45}$ was

the first solids discovered having this peculiar property.

It fuses sharply at $145^\circ C$ to give a turbid liquid which on further heating changes suddenly into clear liquid at $178^\circ C$.

The above changes are reversed on cooling.

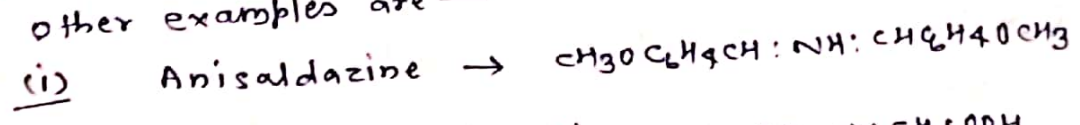
p-cholesteryl benzoate, for instance, the changes may be represented as:

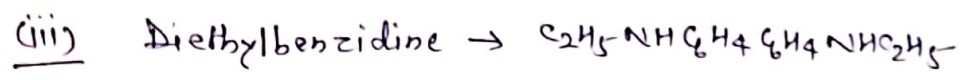


(A = p-cholesteryl benzoate.)

The substances which showing liquid crystal character are highly stable and do not decomposes on heating.

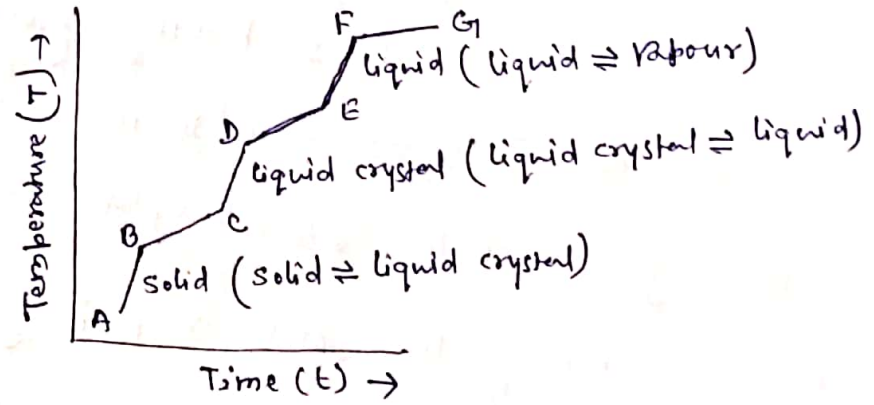
other examples are -





* Thermography :-

The phase changes observed on heating a solid showing mesomorphic behaviour are sometimes represented in the form of a temperature-time graph as shown below -



This is called thermography.

Application :-

In recent years, thermography has found extensive use in medical applications. It has helped in the detection and diagnosis of tumours and breast cancers and orthopaedic disorder such as back pain and arthritis.

The diagnosis is based on heat changes produced in the affected skin are different from those in the healthy skin. The liquid crystals are pressed against the healthier part as well as the diseased part to be examined and colour photographs are taken of the resulting colour patterns and compared with each other.