

Optical microscopy is one of the techniques which involve the use of polarized light to detect liquid crystalline structure (Figure 1). A polarizing microscope equipped with a heating stage permits visual observation of the phase transformations, from micelles phase through liquid crystal phase (Figure 2). The transformation could be as a result of the change of temperature or concentration (Figures 3a and 4b).



Figure 1. Polarising microscope.

Liquid crystal or mesomorphic is the intermediate state between the amorphous and crystalline states, and it mimics skin structure. It was discovered by Lehmann and Wolken in 1908 and 1980 respectively. It has become an area of keen interest, not only to physicists and chemists but also to biologists. The liquid crystalline structures are of interest because of the desire to control the delivery of moisture and active substances in the cosmetics. But the most important application of lamellar liquid crystalline phase is for stabilization of emulsions (Friberg *et al.*, 1970;1976).

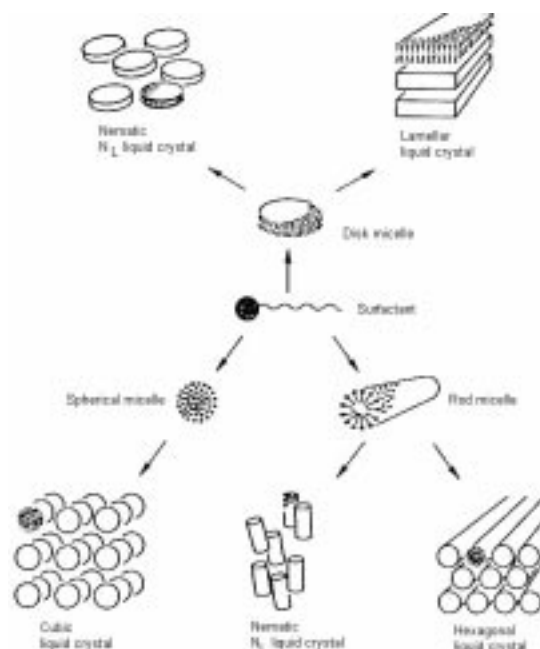


Figure 2. Morphology and orientation pattern of liquid crystals.

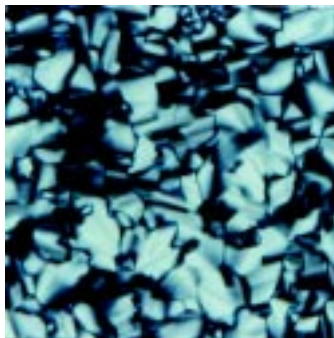
Several techniques are used to identify mesophases; X-ray diffraction, rheology and NMR calorimetry. But polarized light microscopy is the most widely used in which considerable experience is required for identification.

Service offered by the physical testing laboratory:

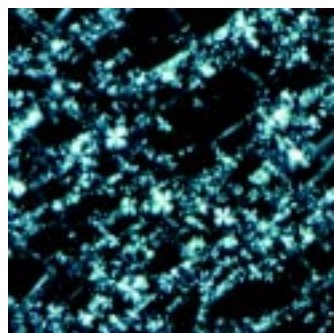
- optical pattern; and
- phase transition.

Duration: optical pattern: one day for three samples.

phase transition: at least two days/sample.



(a)



(b)

Figure 3. Optical pattern for: (a) angular texture in the hexagonal phase (b) Maltese crosses in lamellar liquid phase.

REFERENCES

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