

## Lyotropic Cholesteric Phase Behaviour of Thermotropic Cellulose Derivatives in Isotropic Solvents

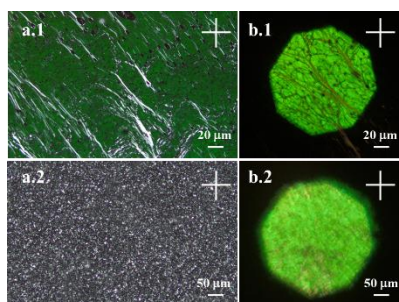
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Thermotropic cellulose derivatives are liquid crystalline materials that form cholesteric phases at room temperature [1]. For processing, these polymers can be dissolved in selected isotropic solvents, where they may also form lyotropic liquid crystalline phases. Such systems are particularly relevant for polymer processing and crosslinking in isotropic or anisotropic environments [2, 3]. In this work, phase diagrams were determined for ester derivatives of hydroxypropylcellulose (HPC), acetoxypopylcellulose (APC), HPC propionate (PPC), and HPC n-butyrate (BPC) in various isotropic solvents. The cholesteric pitch and helicity were evaluated, and the influence of polymer concentration, side-chain length, and medium pH on liquid crystalline behaviour was investigated. The results show that both the critical polymer concentration for liquid crystalline phase formation ( $C^*$ ) and the cholesteric pitch ( $P$ ) increase with increasing aliphatic side-chain length. Additionally, the pH of the medium significantly affects the values of  $C^*$  and  $P$  [3], as well as the isotropisation temperatures. Representative left- and right-handed cellulosic samples with the same pitch ( $P = 345$  nm) illustrating different textures in transmission for Hydroxypropylmethyl cellulose / trifluoroacetic acid (HPMC/TFA) system are presented (Figure 1).



**Figure 1.** **a.1** picture taken in transmission for a left-handed sample and **a.2** for a right-handed sample. **b.1** picture taken in reflection for a left-handed sample and **b.2** for a right-handed sample.

### References

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