Photothermal Investigation of Thermal Transport Parameter Anisotropy of Liquid Crystals

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Photoacoustic (PA) and photopyroelectric (PPE) techniques are very well suited for simultaneous measurements of the temperature dependence of static as well as transport parameters of small liquid crystal samples [1]. Because thermal energy transport in liquid crystals is anisotropic, proper alignment is mandatory. This can be achieved by external magnetic fields and by surface treatment of the relevant cell walls. For our investigations of compounds of the dialkylazoxybenzene (nAB) and alkylcyanobiphenyl (nCB) homologous series, we used in addition to a photoacoustic microphone detection setup, two different PPE techniques. The first one is a conventional photopyroelectric rear detection setup, the sample being sandwiched between an absorbing window and a pyroelectric transducer. In our second PPE setup the window is replaced by a second transparent pyroelectric transducer, gold coated at the sample's side. The combination of the different techniques allows control of sample alignment as well as the measurements of absolute values for static and transport thermal parameters.

The results for the nAB and nCB homologous series will be compared with theoretical predictions relating the anisotropy to the liquid crystal orientational order parameter.

[1] E. Schoubs, H. Mondelaers, and J. Thoen, *J. Phys. (Paris)* **C7**, 257 (1994).