Zenithal gliding evolution of a nematic liquid crystal on orienting photopolymer

Kostyantyn Slyusarenko[a,b], Krassimira Antonova[a], Christophe Blanc[a], Oleksandr Buluy[b], Yuriy Reznikov[b] and Maurizio Nobili[a]

[a] *Laboratoire des Colloïdes, Verres et Nanomatériaux, Université Montpellier II / CNRS, Place E. Bataillon, 34090 Montpellier, France*

[b] *Institute of Physics, National Academy of Sciences of Ukraine, Prospect Nauki 46, Kyiv 03028 Ukraine*

Photopolymers are very promising liquid crystal orienting layers as they are obtained by non-contact UV photo-polymerization and do not suffer of all the drawbacks of rubbing techniques (static electricity, dust particles,...). It gives a possibility to control LC orientation by changing the surface irradiating it by UV light. The characteristic feature of these materials is a strong gliding of the easy axis orientation under an external torque [1]. In this paper, we present the study of zenithal gliding of a nematic liquid crystal 5CB homogeneously oriented on a photoaligning material polyvinyl-4fluorocinnamate (PVCN-F).

In the experiment we apply a strong disorienting electric field to the sample and we measure LC director relaxation after the switching off of the field by a lock-in method [2]. This process was cycle to obtain a set of curves at different sample ages. The typical relaxation curves is not exponential but is well fitted with three exponentials.

Curves at different ages collapse on one master curves by applying an affine transformation plus a translation like: .

Differently from glassy systems the dynamic characteristic time “1/b” decreases. The amplitude of the relaxation “a” is also decreasing. Both of these experimental findings are in agreement with a stiffening of the polymer layer.

[1] O. Buluy, Y. Reznikov, K. Slyusarenko, M. Nobili, and V. Reshetnyak. *Opto-Electron. Rev.*, 14, No.4, pp. 293-297, (2006)

[2] S.Lamarque-Forget et al , *Jpn. J. Appl. Phys.*, **40**, L349, (2001).