Physical mechanism for liquid crystal alignment on polymer substrate

Determining the Liquid Crystal (LC) anchoring properties on polymer surface is still open question. It has been well known that LC ordering depends on chemical interaction between LC and alignment layer or morphological interaction between anisotropic properties of LC and anisotropy of polymer surface. In describing the LC anchoring, simple macroscopic phenomenological approach of Rapini-Papoulis has been typically used. The anchoring strength was determined by coupling of LC, polymer and rubbing process. Recently the new microscopic model describing the LC orientational ordering has been proposed. In the model, the orientational chain distribution of polymer surface can provide anchoring energy for surface LC molecules. That means we can determine LC anchoring properties by material-independent method. In this presentation, we will introduce this new model of LC alignment and discuss the relation between anisotropy of polymer chain and LC ordering.
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