Self-Organization of Cholesteric Liquid-Crystal Polymers on Metal Substrates

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Optoelectronic Cholesteric liquid-crystal-polymers (ChLCP), synthetized in our lab [1], when dispersed in solution, self-organize on metal surfaces, such as: Si(111); Pt / TiO2 / SiO2 /Si(001), Ag, Au, either colloidal spheres or thin layers [2].

Under spin coating controlled conditions growth has been obtained in multilayer ordered structures, Figure 1.

Their HELICAL MACROMOLECULES, Figure 2, uncoil and get adsorbed on the metal via π-interaction, with the aromatic rings extended parallel to the interface and the aliphatic chains directed towards the bulk solution, according to the scheme depicted in Figure 3.

The interaction of these ChLCP with metals could be applied to the design of functionalized surfaces provided with physico-chemical properties of interest.

Besides, our synthetic cholesteric liquid-crystals, exhibit OpticalRotatory Dispersion(ORD), complex Circular Dichroism (CD) patterns, transmitance and reflectance, with potential application in various areas of nanotechnology, such as: CHLC DISPLAYS WITH PHOTOCHROMIC RESPONSE [3], FIBER COUPLED CHOLESTERIC LIQUID CRYSTAL LASERS [4], BIOSENSORS IN RECOGNITION PHENOMENA and MEMs [5].

References

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Figures

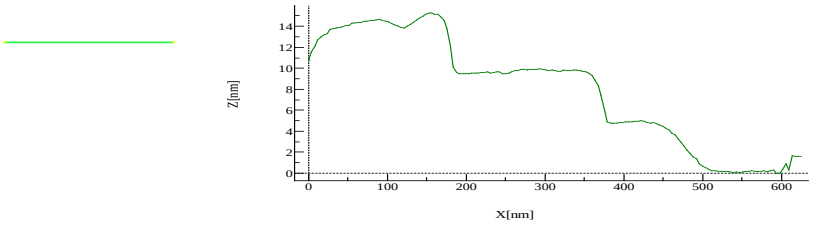

Figure 1. Multilayered structure of ChLC polymer grown by spin coating.

Figure 2: ChLC polymer helical molecule

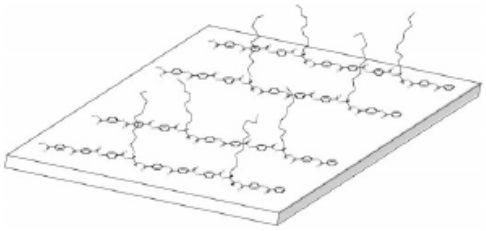

Figure 3: Adsorption of extended ChLC polymer on Ag thin layer.