

"From liquid crystal single domains to single crystal thin films"

Yves Henri Geerts (ygeerts@ulb.ac.be)

Université Libre de Bruxelles (ULB), Faculté des Sciences, Laboratoire de Chimie des Polymères, CP 206/1, Bd du Triomphe, 1050 Bruxelles, Belgique

Order is amongst the most important parameters that govern the physics of organic semiconductors (OSCs) [1]. However, materials must be ordered at all length-scales, from molecular dimensions to macroscopic distances [2]. Liquid crystals constitute a unique class of materials that spontaneously self-assembles into single domain thin films with specific alignment [3-5]. Patterning of aligned single domains of liquid crystalline OSCs has recently been demonstrated [6,7]. Nevertheless, liquid crystalline semiconductors suffer from numerous structural defects created by their partial liquid character and that limit their charge carrier mobility [1,8,9]. Single crystals exhibit the highest charge carrier mobility of organic materials but their size, shape and alignment can not be controlled yet. Recently, we have demonstrated that the size, shape and alignment of organic single crystals of OSCs can be modified with the use of a thermal gradient that allows the separation of nucleation and growth [10]. We will report several examples of directional crystallization and discuss the physical parameters that allow the fabrication of single crystals. Information on our activities and publications are available at: <http://www.ulb.ac.be/sciences/chimpoly>. The work has been supported by the FP7-ONE-P project under grant agreement n° 212311, see <http://www.one-p.eu/public>.

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