Ordered conjugated polymers for organic electronics

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Solution processable conjugated polymers are promising for large area, lightweight, and flexible field-effect transistors. Control over their thin film microstructure and polymer organization is crucial for the charge carrier transport in transistors. Meniscus-guided coating covers techniques like zone-casting, blade-coating, dip-coating, and solution shearing, and is an efficient approach to solution process conjugated polymers into highly ordered thin films. Over the recent years, zone-casting has been further developed to precisely tune the crystallization of semiconducting polymers and to improve their charge carrier transport.

This presentation discusses the crystallization and film growth mechanism of conjugated polymers during zone-casting and dip-coating that are essential for the thin film deposition for field-effect transistors. An understanding of the alignment mechanism and fundamental principles of the fluid mechanics for the crystal growth has been developed. Relations between meniscus shape, fluid mechanical process and polymer crystallization during solution processing are provided. Homogeneous mono- and multilayers based on conjugated polymers have been fabricated for transistor applications through a careful control of the processing conditions [1].

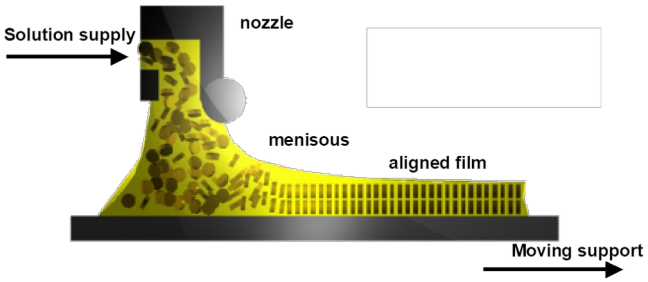

Figure 1: Illustration of the zone-casting process to control the organization of conjugated polymers in thin films.

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