Electronic Supplementary Material (ESI) for RSC Advances.

Supporting Information

Structures of spin-coated and annealed monolayer and multilayer poly(3-dodecylthiophene) thin films

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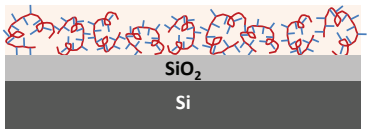
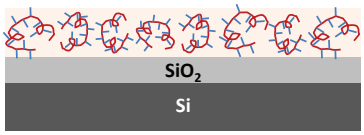
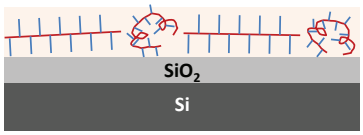


1-layer: Single layer of amorphous coil-like P3DDTs (***of uniform density***) attached to SiO_2/Si substrate



2-layer: Single layer of amorphous coil-like P3DDTs (***of uniform density***) attached through side tails (***of low density***) to SiO_2/Si substrate



3-layer: Predominantly edge-on oriented P3DDTs (***of low-high-low density***) monolayer attached to SiO_2/Si substrate

Fig. S1 Schematic structures of the 1-layer, 2-layer and 3-layer models used for the analysis of the XR data of the SL-P3DDT/OH-Si film. Note that the 1-layer and 2-layer models represent the disorder structure, while the 3-layer model represents the existence of edge-on oriented order structure. Increase in the fraction of the edge-on oriented structure is expected to enhance the contrast between high density (polymer backbone) layer and low density (side chains) layer.

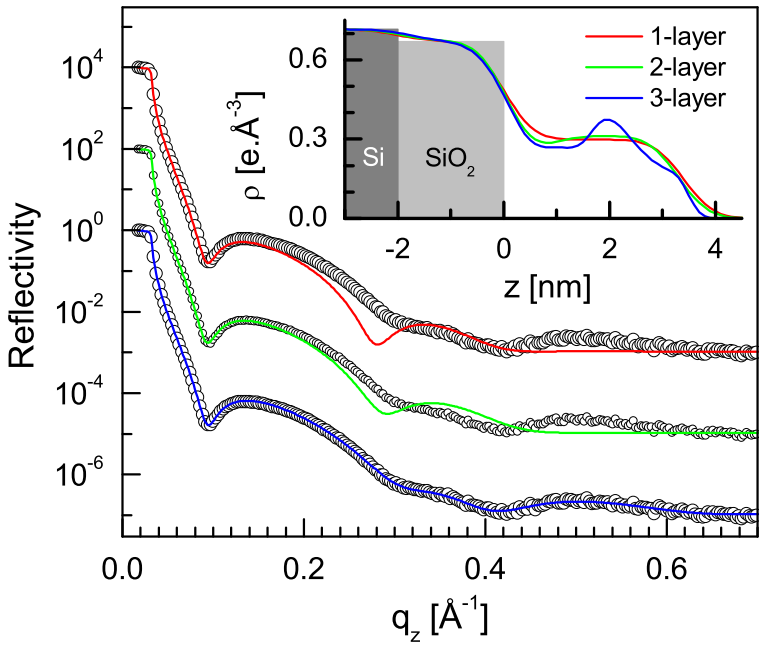


Fig. S2 XR data (symbols) and analyzed curves (solid line) of the SL-P3DDT/OH-Si film. Analysis have been carried out considering 1-layer, 2-layer and 3-layer (above oxide coated Si substrates) models. Curves are shifted vertically for clarity. Inset: corresponding analyzed EDPs. It is evident that the 3-layer model, corresponding to the predominantly edge-on oriented P3DDTs monolayer (see Fig. S1), is necessary for the proper analysis.

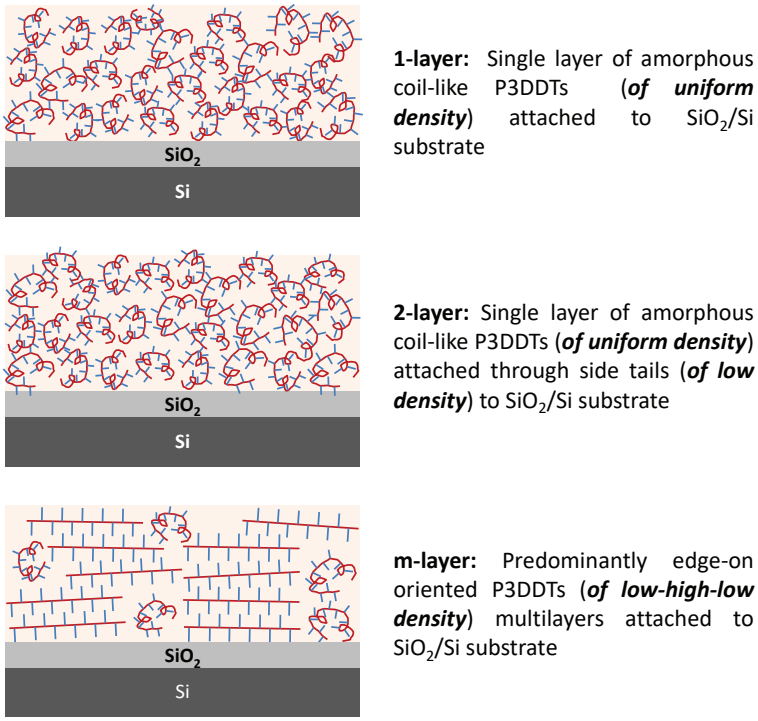


Fig. S3 Schematic structures of the 1-layer, 2-layer and m-layer models used for the analysis of the XR data of the ML-P3DDT/OH-Si film. Note that the 1-layer and 2-layer models represent the disorder structure, while the m-layer model represents the existence of edge-on oriented order structures. Increase in the edge-on ordering is expected to give rise better contrast between low and high density layers and/or their periodicity towards uniform value (of about 2.6 nm).

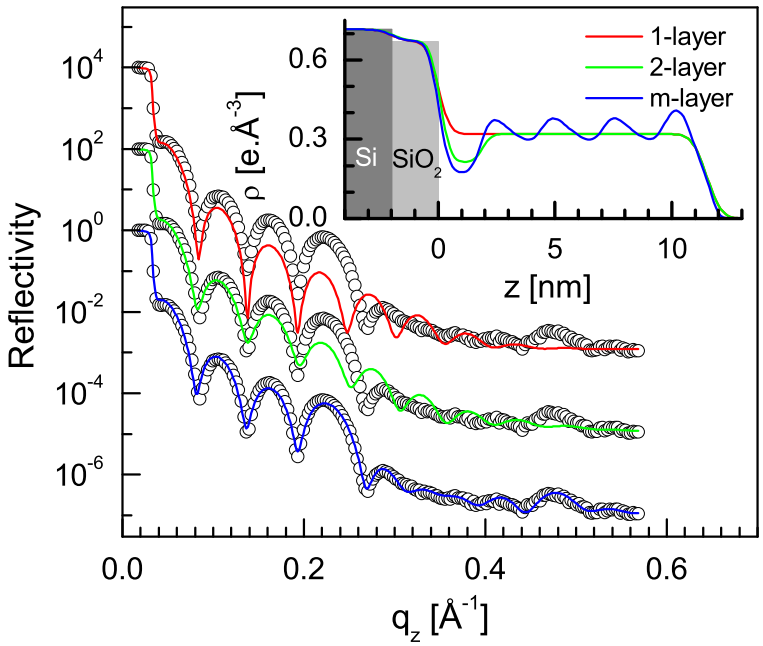


Fig. S4 XR data (symbols) and analyzed curves (solid line) of the ML-P3DDT/OH-Si film. Analysis have been carried out considering 1-layer, 2-layer and m-layer (above oxide coated Si substrates) models. Curves are shifted vertically for clarity. Inset: corresponding analyzed EDPs. It is evident that the m-layer model, corresponding to the predominantly edge-on oriented P3DDTs multilayers (see Fig. S3), is necessary for the proper analysis.