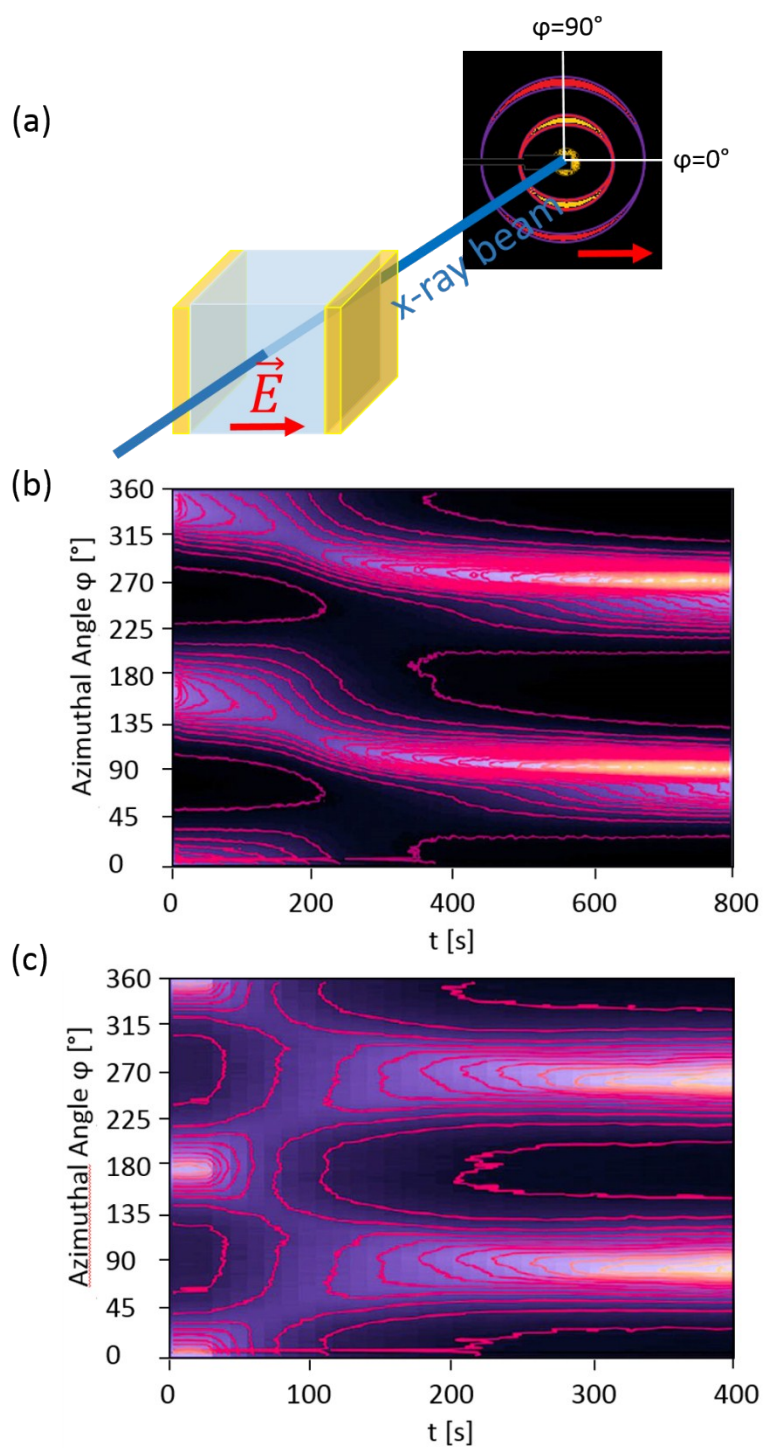


## Supporting Information

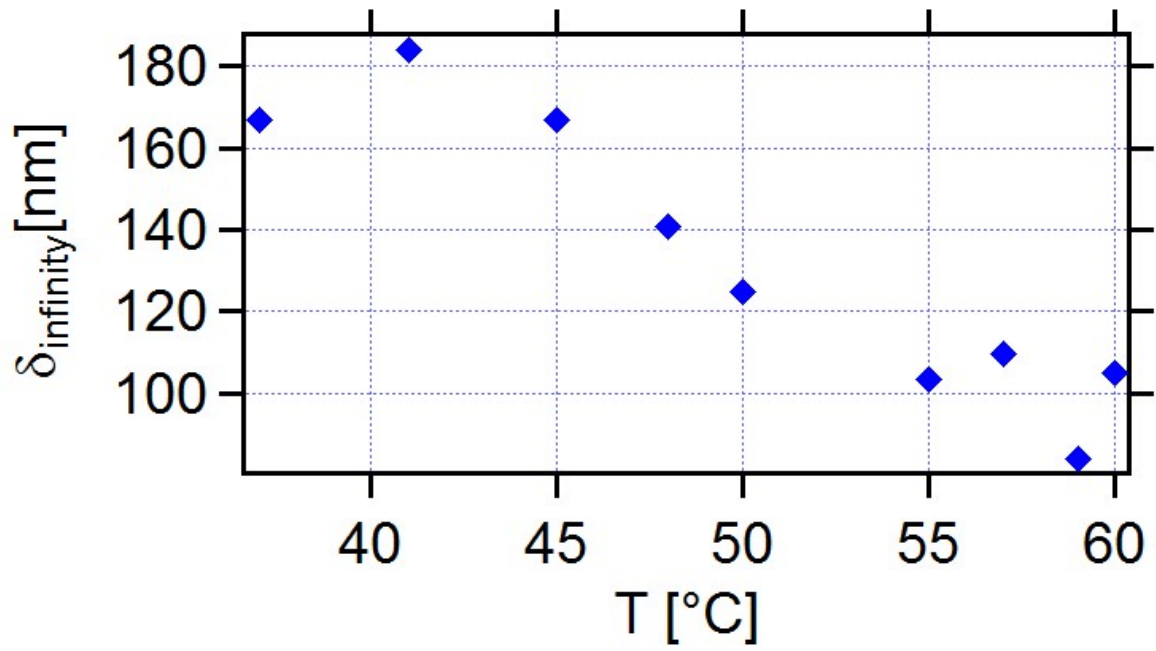
### Reorientation Mechanisms of Block copolymer/ CdSe Quantum Dot Composites under Application of an Electric Field

Christine C. Kathrein, Christian Pester, Markus Ruppel, Maike Jung, Marc Zimmermann, and Alexander Böker

S1:



The reorientation behavior of a 47.5 wt% solution of polystyrene-*block*-polyisoprene at 27°C and 80°C was analyzed. The block copolymer had a molecular weight of 80 kg mol<sup>-1</sup> whereby the weight fraction of polystyrene amounts 0.52. The results of the SAXS measurements are given in Figure S1. A schematic image of the setup is given in Figure S1 (a). The 0° and 90° azimuthal angles are marked in the schematic 2D SAXS scattering pattern. In Figure S1 (b) (27 °C) and (c) (80 °C) the scattering intensity with respect to the azimuthal angle,  $I(\varphi)$  is plotted against time. Time-resolved experiments allow to map the shift in azimuthal intensity,  $I(\varphi)$ , from  $\varphi= 0^\circ/ 180^\circ$  to  $\varphi = 90^\circ/270^\circ$  on the seconds timescale after application of electric field, which corresponds to a reorientation of lamellar interfaces from perpendicular to parallel with respect to the direction of  $\mathbf{E}$ . The time-evolution of  $I(\varphi)$  is an excellent indicator of the underlying mechanistic pathway for lamellar alignment. At the beginning of the measurement the block copolymers are oriented perpendicular to  $\mathbf{E}$  due to shear alignment which occurs while filling the sample cell via a syringe. This results in a maximum intensity at 0° and 180°. Figure S1 (b) (27 °C) gives the typical time evolution of the azimuthal intensity for a rotation of grains mechanism (RG). The maximum intensity gradually shifts from  $\varphi=0^\circ$  and  $\varphi=180^\circ$  to  $\varphi=90^\circ$  and  $\varphi=270^\circ$  implying that the grains present in the sample start rotating into their final orientation as soon as the electric field is applied. In case of Figure S1(c) (80 °C) at first a loss of intensity is observed at 0° and 180° followed by a sudden increase of intensity at 90° and 270°. Grains with lamella interfaces oriented parallel to the electric field vector grow at expense of those perpendicular to  $\mathbf{E}$ . The measurements imply that rotation of grains (RG) is the dominant reorientation mechanism at lower temperatures, while the block copolymer preferably realigns via nucleation and growth at elevated temperatures in close vicinity to the  $T_{ODT}$ . For a more detailed description of the results we refer to the corresponding paper by Böker et al. (A. Böker, H. Elbs, H. Hänsel, A. Knoll, S. Ludwigs, H. Zettl, V. Urban, V. Abetz, A. H. E. Müller and G. Krausch, *Phys. Rev. Lett.*, 2002, **89**, 135502–135504.)



S2:  $\delta_{\infty}$  plotted against the temperature at which the realignment measurement was performed.