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Influence of Electric Fields on the Phase Behavior of Concentrated Block Copolymer Solutions KRISTIN SCHMIDT[1], HEIKO SCHOBERTH, ALEXANDER BÖKER, University Bayreuth — We investigate the influence of the electric field on the phase behavior of diblock copolymer concentrated solutions using synchrotron SAXS. We find a significant dependence of the characteristic domain spacing on the electric field strength. For lamellae aligned parallel to the electric field direction we observe that the lamellar spacing decreases with increasing field strength, while for perpendicularly oriented lamellae the domain spacing increases. We also find that the electric field can induce an order-order transition if the block copolymer has a composition close to the predicted phase boundary. Due to the lower free energy of aligned anisotropic microdomain structures parallel to the electric field, we can induce a transition from the metastable hexagonally perforated lamellar phase to the lamellar phase without perforations by applying strong electric fields. Similarly an isotropic cubic gyroid phase, which is stable in the absence of, but cannot be aligned by, the field, transforms to aligned cylinders when a strong electric field is applied.

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