Supporting Information

From LC-polymers to nano medicines -
Different aspects of polymer science from a materials viewpoint

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List of figures as a sketch to the scientific topics

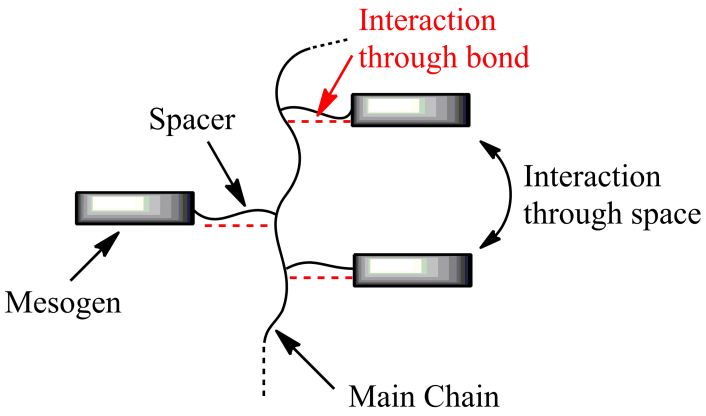
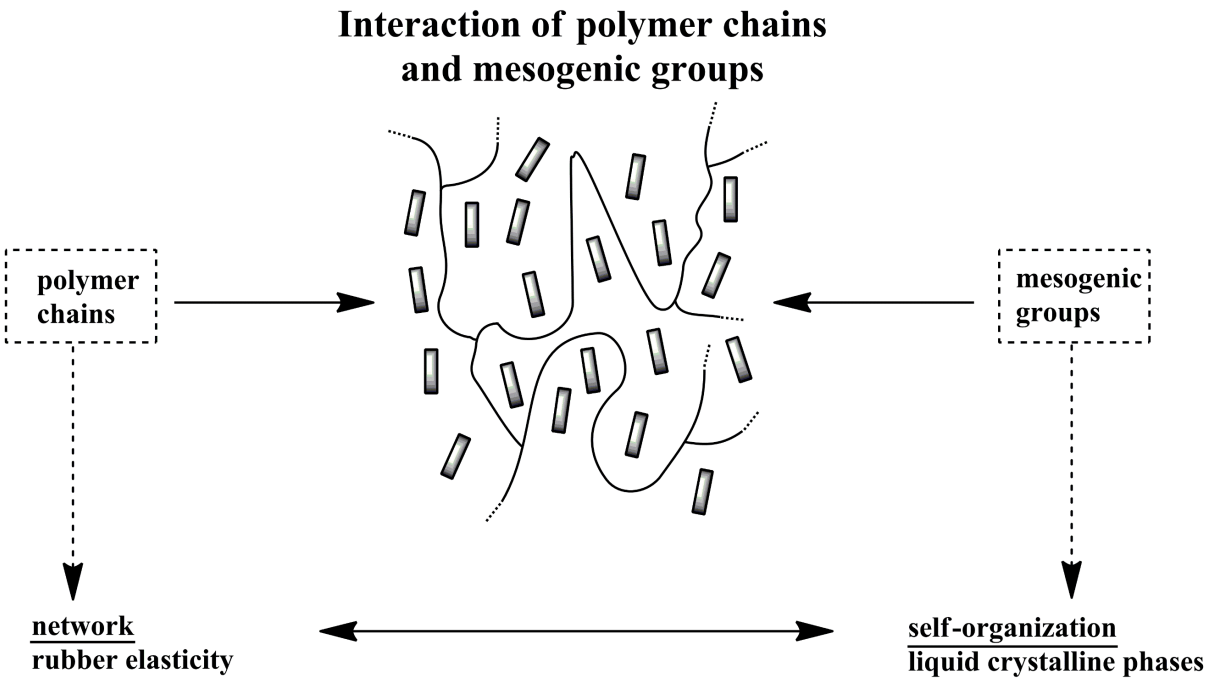


Figure S1: LC-side chain polymers and the interaction of the mesogens through space and through bond. The interaction through bond adds an additional contribution, which is not existing in low molar mass liquid crystals.



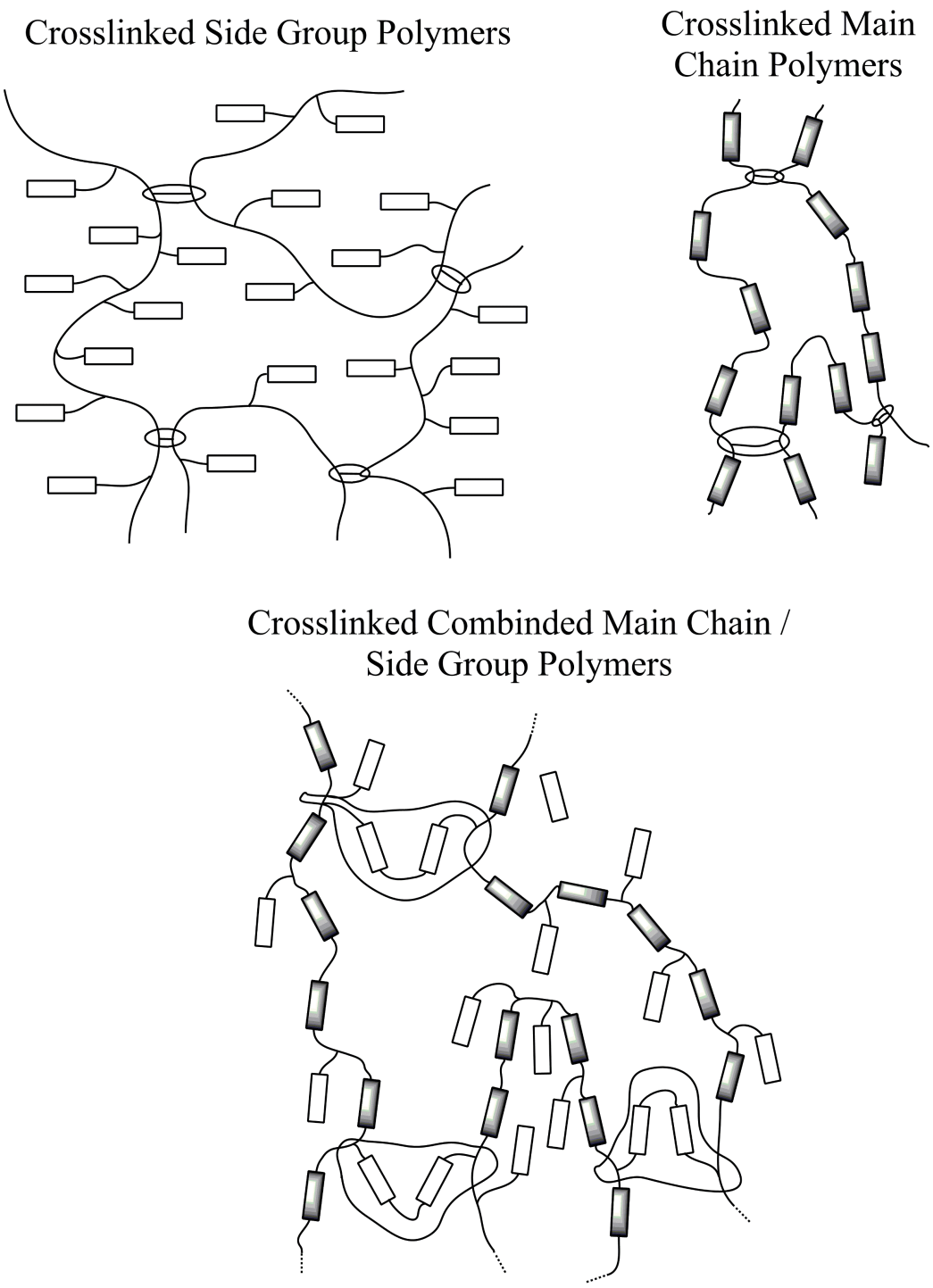


Figure S2: LCEs (liquid crystalline elastomers) and the interaction of the subsystems of mesogenic groups and polymer network. Above: schematic presentation, below: chemical realization in side chain, main chain and “combined” polymers. Figure adapted from ref. [5]

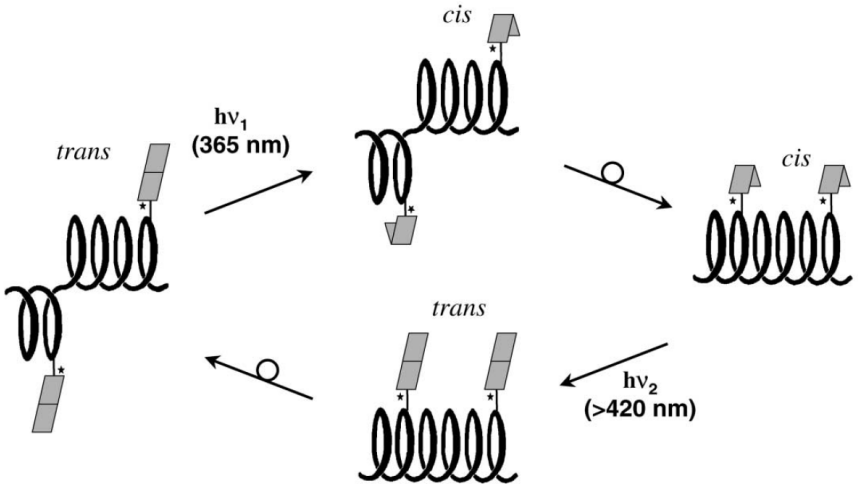
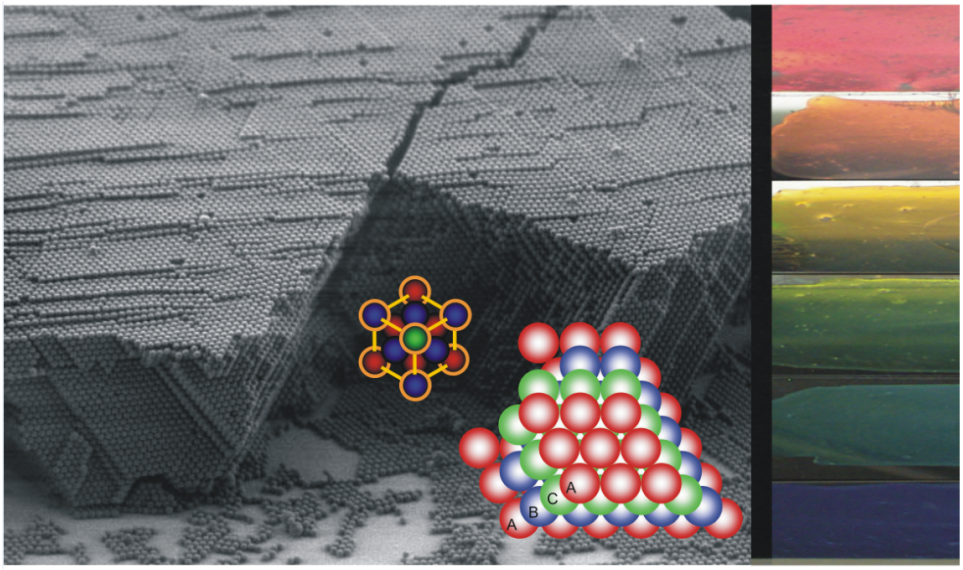


Figure S3: Schematic sketch of the situation in helical polyisocyanates, in which the main chain is achiral (lacking a permanent chiral center) but has to be helical (left- or right handed. Here the isomerization of a chiral side group changes the interaction between side group and main chain and changes the excess of one helical conformation. Figure adapted from ref. [10]



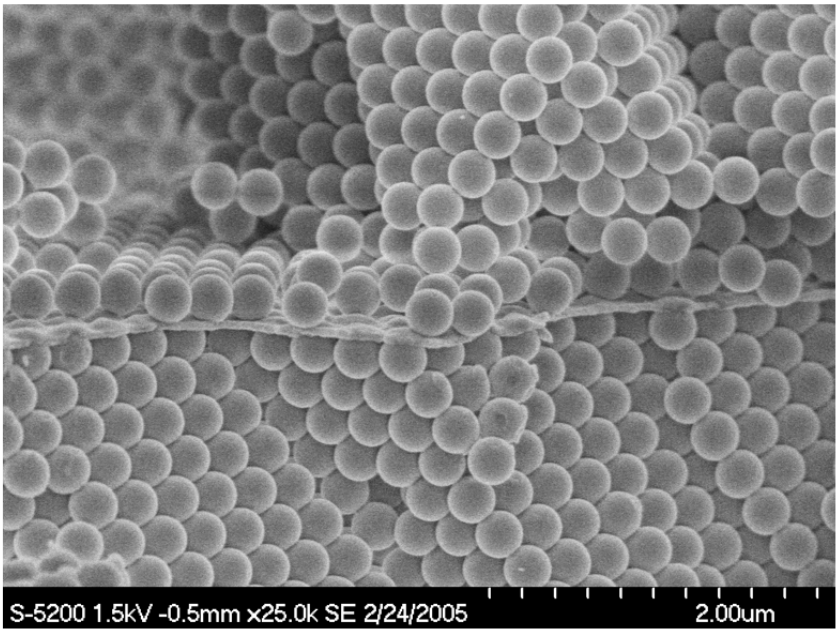


Figure S4: Artificial opals from monodisperse PMMA spheres. Upper part, left side: SEM picture together with a sketch of the cubic densest packing of the spheres (diameter about 500 nm), right side: reflection color of such opaline films made from spheres of a different diameter. Lower part: defect line in an artificial opal. Pictures adapted from ref. [16]

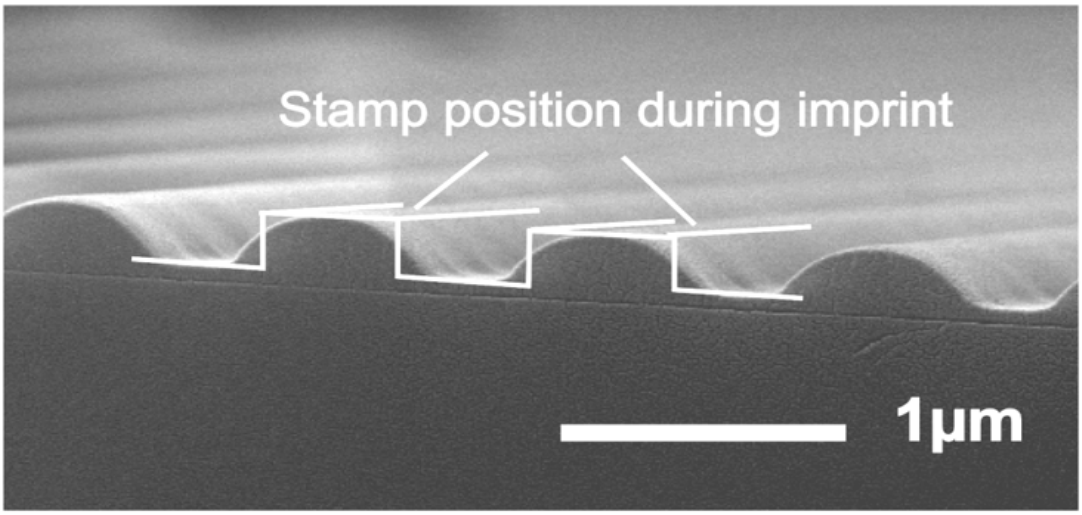


Figure S5: Patterning by stamping of semiconducting polymers followed by photo-polymerization. Picture adapted from ref. [18]

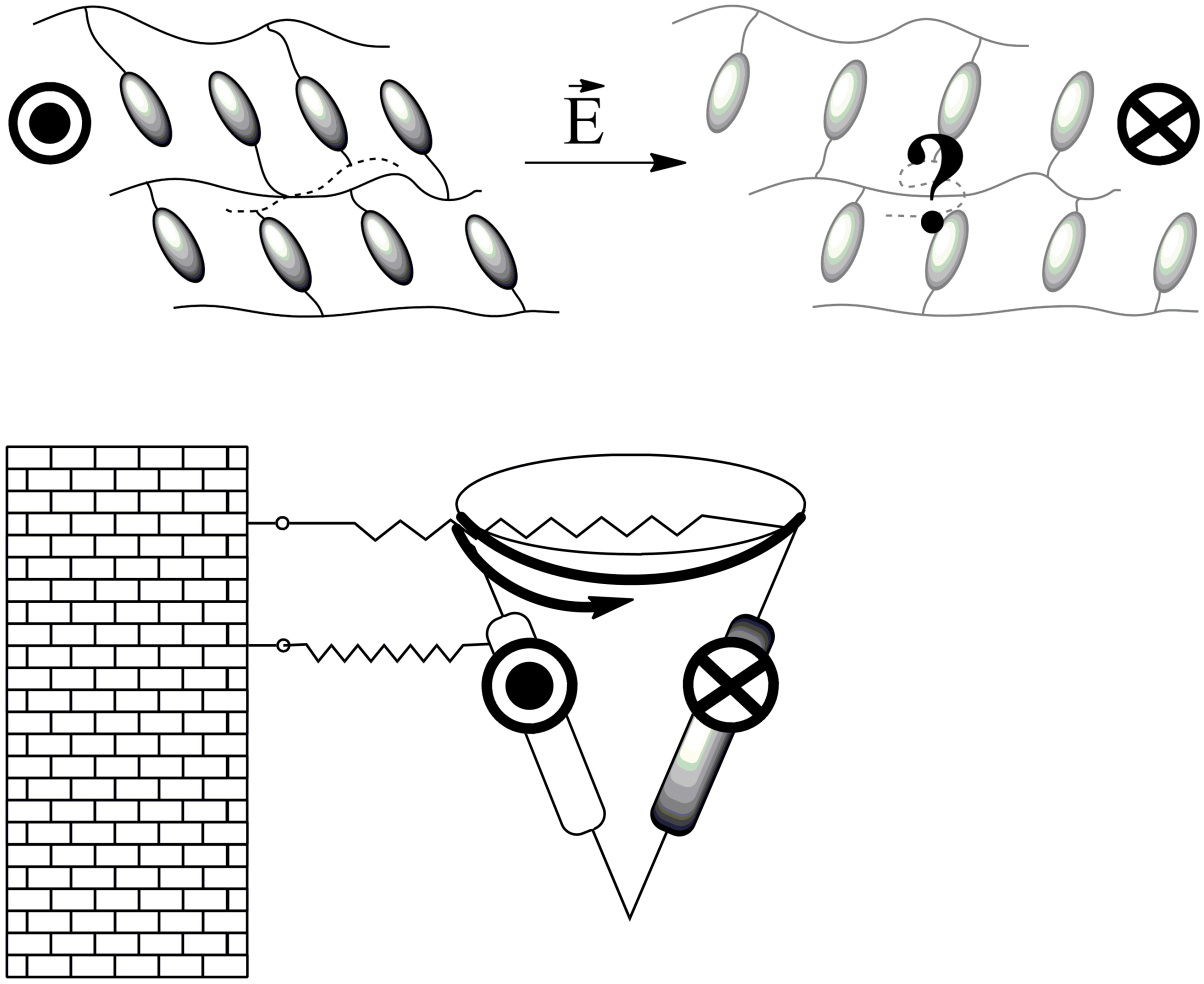


Figure S6: Above: ferroelectric liquid crystalline polymers and their switching in external electric fields, which inverts their internal spontaneous polarization and below: the consequences on this on the elasticity of the polymer network in ferroelectric LCEs, which stabilizes one switching state; pictures adapted from refs. [22, 25]

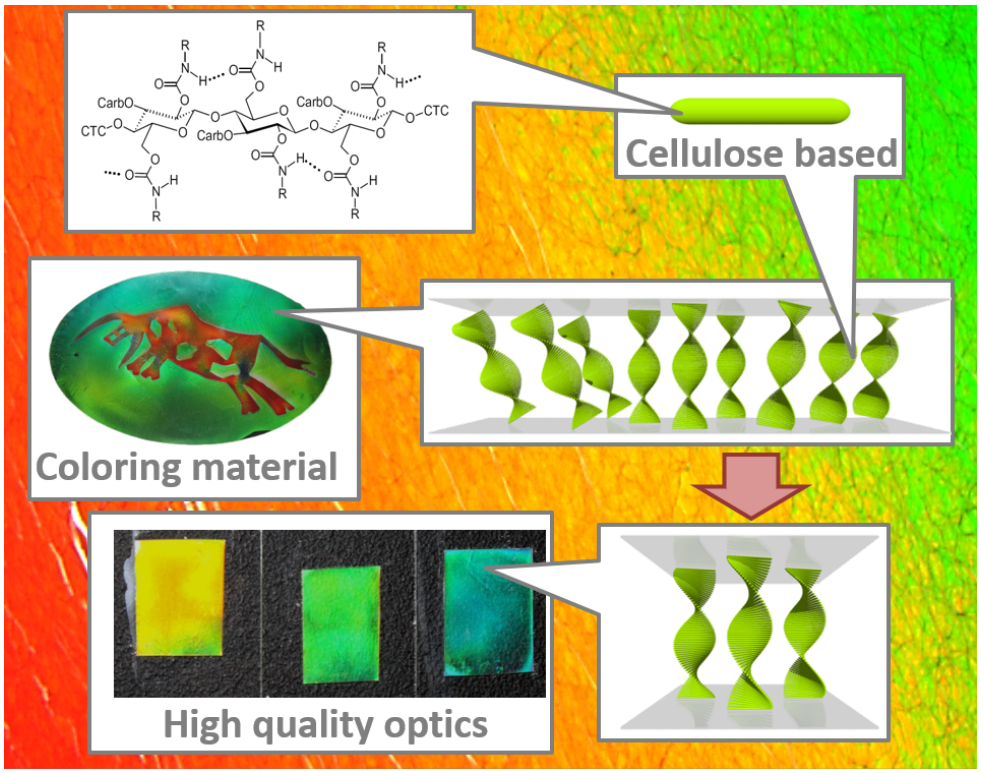


Figure S7: Crosslinked cholesteric polymers as coloring materials and high quality optical materials for lasing. Picture taken from ref. [32]

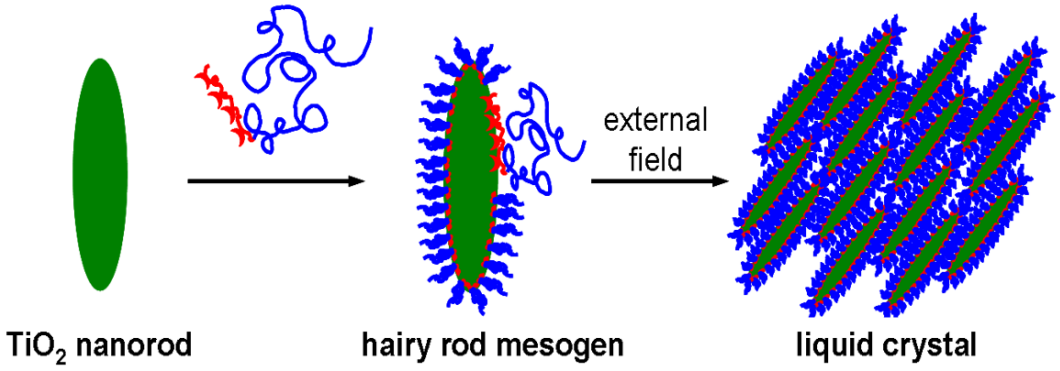
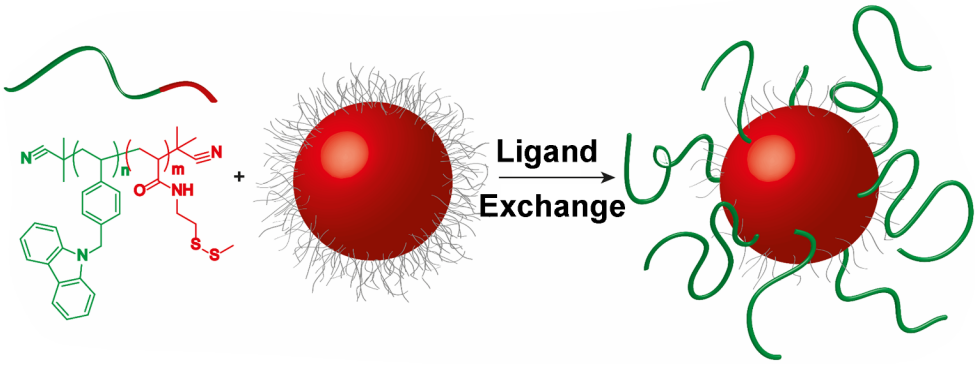


Figure S8: Polymer coating of shape anisotropic nanoparticles improves their solubility in organic media and allows the preparation of LC-phases in concentrated solutions, picture adapted from ref. [38]



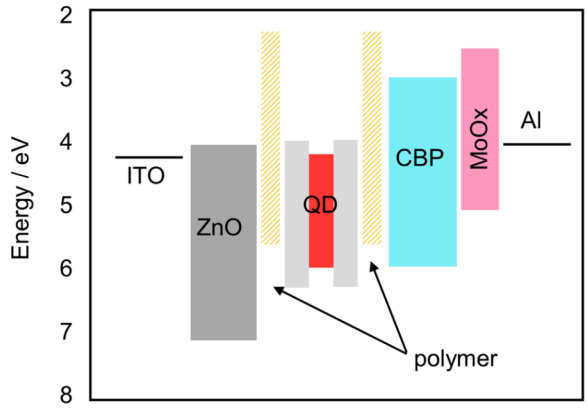


Figure S9: Polymer coating of fluorescent quantum dots with semiconducting polymers allows it to incorporate them homogeneously in a semiconducting polymer matrix, picture adapted from ref. [43]

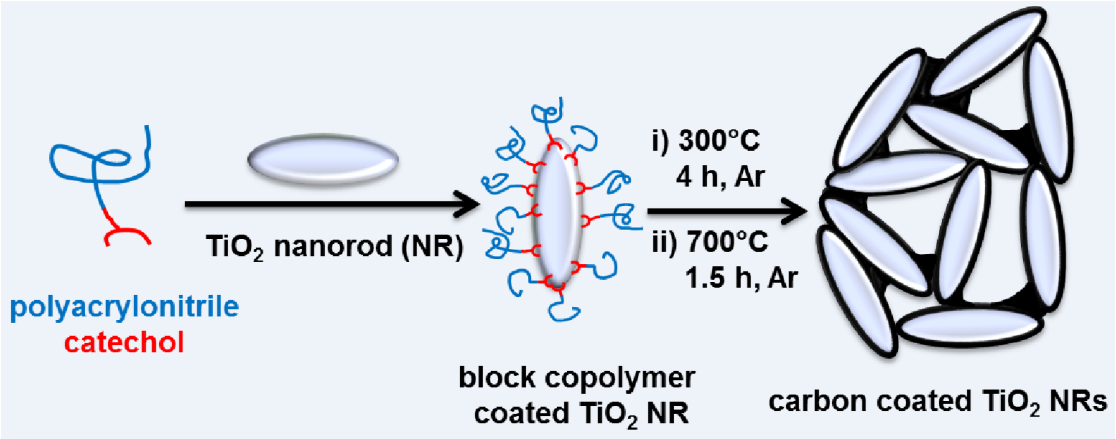


Figure S10: Coating of inorganic nanoparticles with a carbonaceous layer for improved performance in battery applications; picture adapted from ref. [45]

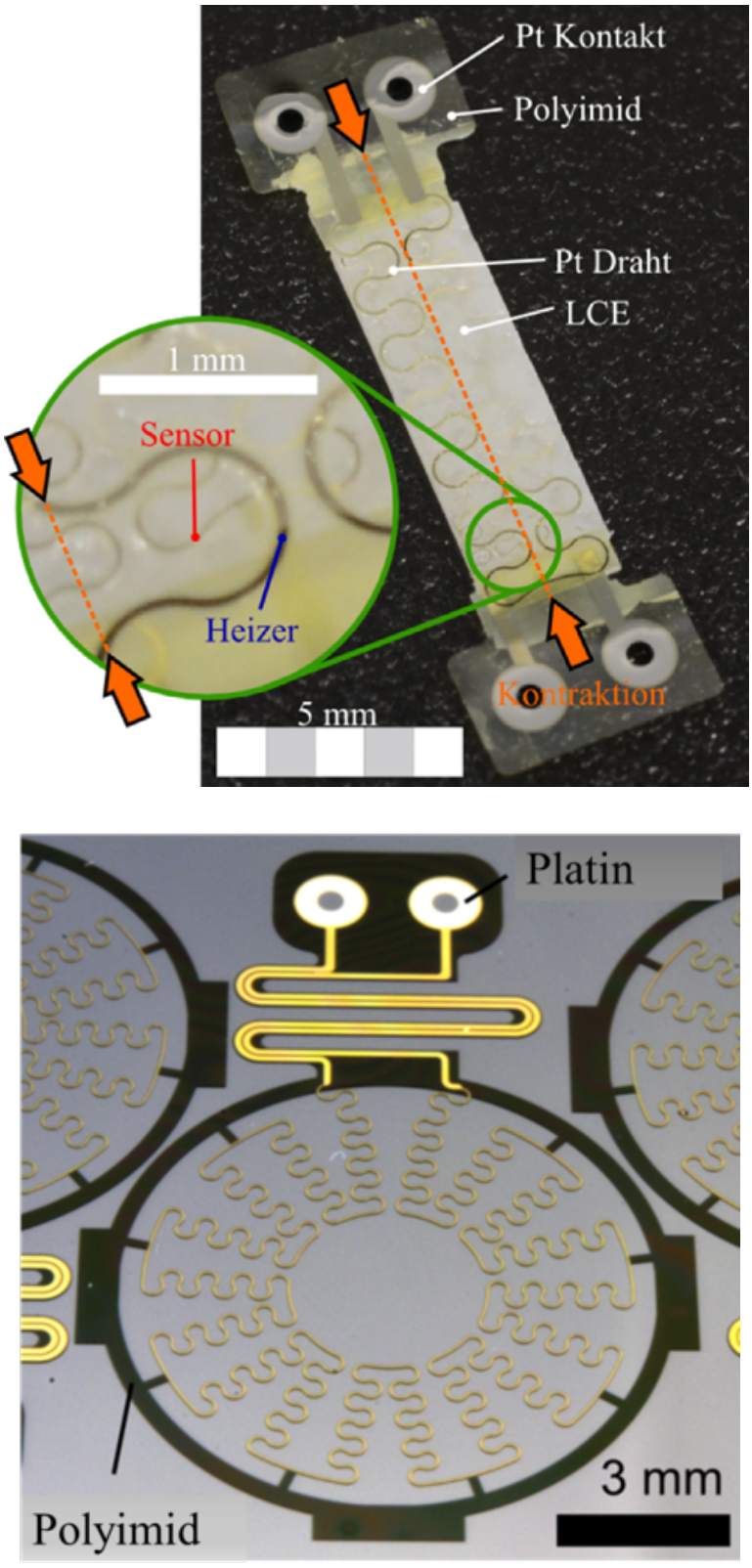


Figure S11: Electrically driven LCEs as actuators for applications in adaptable optical systems. Stretching device to deform an elastic lens (above) or iris like structure (below) (adopted from refs. [54, 55])

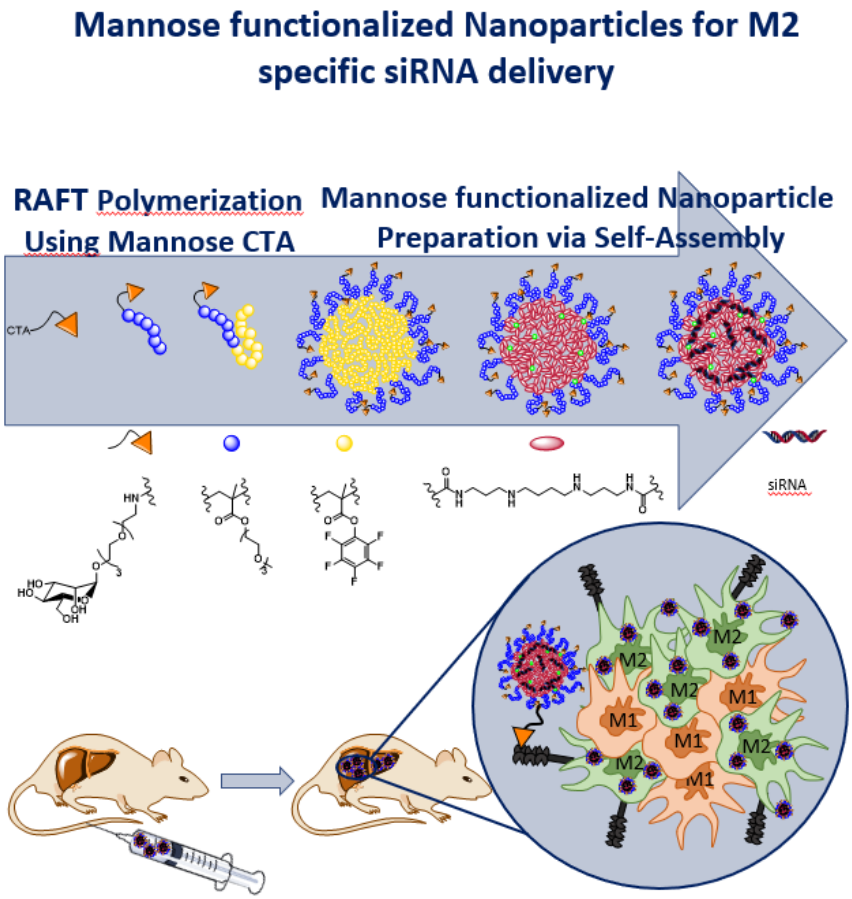


Figure S12: Cationic nanogels prepared from reactive ester block copolymers allow the transport of siRNA and a tissue and cell specific knock-down

Figure S13: Rudolf Zentel, born 11.11.1953