Synthesis of Helical Conjugated Polymers in External Perturbation-Responsive Chiral Liquid Crystal Field and Their Circularly Polarized Luminescence

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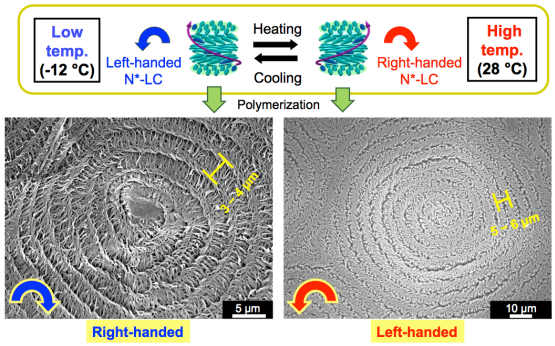
Helical conjugated polymers have been attracting current interests because of their peculiar structures, morphologies and optoelectronic properties.[1] Hierarchically assembled helical conjugated polymers are anticipated to exhibit highly enhanced and even novel chiroptical properties. We have developed a novel polymerization method for synthesizing helical conjugated polymers by using chiral nematic liquid crystals (N*-LC) as asymmetric reaction fields.[2] Recently, helicity-controlled polyacetylene[2,3] (Figure below) and poly(ethylenedioxythiophene)[4] are synthesized with thermally invertible[3] and photoinvertible[5] chiral liquid crystals, respectively. It is of keen interest that the helical sense of helical polyacetylene is opposite to that of the N*-LC because of the peculiar polymerization mechanism for acetylene in the N*-LC. Switching and amplification of circularly polarized luminescence of helical conjugated polymers are achieved using selective reflection and transmission of chiral nematic liquid crystals.[6]



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