‘Spontaneous’ Pathway Selection in Stereochemical Supramolecular Copolymerization: Metal–Organic Nanotubes Assembled with a Planar Chiral Monomer

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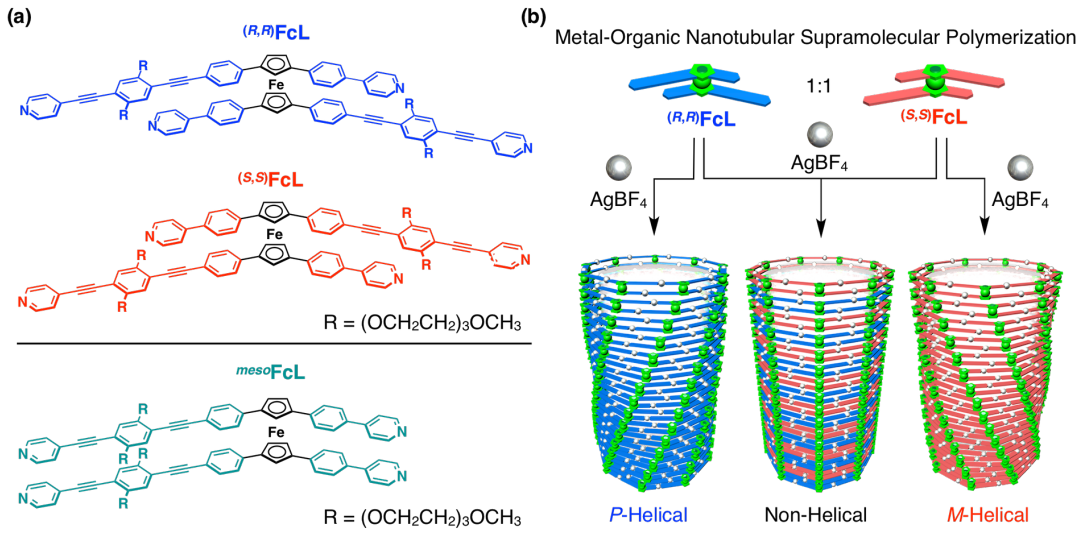
Helical metal–organic nanotubes have the potential of chiral separation and asymmetric synthesis.[1] However, the channel dimensions of the metal–organic nanotubes so far reported are not large enough to accommodate functional organic guests.[2] Here we report a one-handed helical (homochiral) metal–organic nanotube with an unprecedentedly large diameter of 9.1 nm by Ag^{+}-mediated supramolecular polymerization of **FcL**, a planar-chiral ferrocene-cored tetratopic pyridyl monomer. When its enantiomers $^{(R,R)}$**FcL** and $^{(S,S)}$**FcL** were allowed to copolymerize, we found an unusual dependency of the chiroptical feature of the produced copolymer on the enantiomeric excess of employed **FcL**. Furthermore, the obtained metal–organic nanotubes showed a large heterogeneity in diameter. Detailed investigations suggested the occurrence of a spontaneous pathway selection in the supramolecular copolymerization due to a non-monotonic consumption of the chiral monomer as a consequence of the preferential occurrence of a heterochiral chain growth.



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