Ta a , Na a ,

Hokkaido University, Japan

selective photo excitation

Interactions between substances and light play important roles in life. One of the most important aspects is photosynthesis by plants and other organisms. In photosynthesis, sugars and molecular oxygen are produced from carbon dioxide and water where photon energy drives the reaction. Moreover, in arti cial chemical synthesis, light promotes various reactions that are not driven by thermal energy. Further, in reactions where chiral compounds are produced, non-racemic products can be obtained using circularly polarized light (CPL). We recently reported that a preferred-handed helical conformation is induced for a linear poly uorene derivative (poly (9,9-dioctyl uorene-2,7-diyl [PDOF]) in the solid state when the polymer is irradiated with CPL. e mechanism of this chirality induction involves a twisted-coplanar transition (TCT) of an aromatic–aromatic junction in the polymer where one of the enantiomeric, right- and le -handed twists is preferentially excited into the coplanar conformation. TCT through photo excitation was rst predicted for biphenyl through theoretical calculations. In the CPL-driven helix formation of the linear poly uorene derivative, strong inter-chain interactions were important in e ectively induce chirality, which in turn implicates that polymers with weak inter-chain interactions cannot be subjected to the CPL method. is point of the CPL method was overcome using aid molecules which reinforce or simulate inter-chain interaction; a star-shaped uorene oligomer having only weak inter-chain interactions was successfully made optically active. In addition, photo-transformation of 1,10-bi(2-naphthol) (BINOL) was studied.