

## Self-Assembly of Nanoparticles into Twisted Ribbons with Light-Controlled Pitch

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Helical structures are among the most ubiquitous in nature due to their unique properties. They are typically produced by the self-assembly of common building blocks of living matter: proteins, amino acids, and oligonucleotides. Like these building blocks, CdTe nanoparticles biomimetically self-assemble into structures that form twisted ribbons. The mechanism of this process is elucidated in detail using both experiments and computer simulation. The pitch of the produced twisted ribbons is controlled by the intensity of illumination in the visible region due to the gradual increase of mechanical stress in the ribbon with greater illumination intensity, which is alleviated by twisting. Beyond biomimicry, the fundamental importance of this study includes: (1) the first demonstration of many-body cooperative processes in a nanoparticle system driven by oxidative evolution of the individual CdTe nanocrystals, and (2) a novel optical effect in nanostructures. This study also demonstrates a viable pathway for the fabrication of nanomaterials possessing helical conformation with fine control of their geometry.