METAMORPHIC APPROACHES FOR ON-SURFACE SWITCHING OF CHIROPTICAL PROPERTIES

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One great challenge nanoscience is facing is the difficulty to transpose molecular-scale phenomena into macroscopic properties finding application in everyday-life devices. A way to address this issue is to develop metamorphic molecular systems for which an external stimulus triggers a drastic structural reorganization. Based on this strategy, our project bridges the gap between chiroptical properties observed in solution for Circularly Polarized Luminescence (CPL) switches1 and their use in device-like systems as major breakthrough.

This work is focused on synthesis and investigation of new boron-based chiral fluorophores and their implementation on bis-viologen hinges to create stimuli-responsive CPL switches with metamorphic properties (see Figure 1). Chirality is either induced on the boron based fluorophores2–4 using BINOL5 or helicene-like subunits. Different strategies are also currently being developed to incorporate these chiroptical dyes on molecular switches. Once fluorophores are synthesized using new synthetics pathways, their photophysical and chiroptical properties are firstly studied in solutions before addressing on-surface properties.

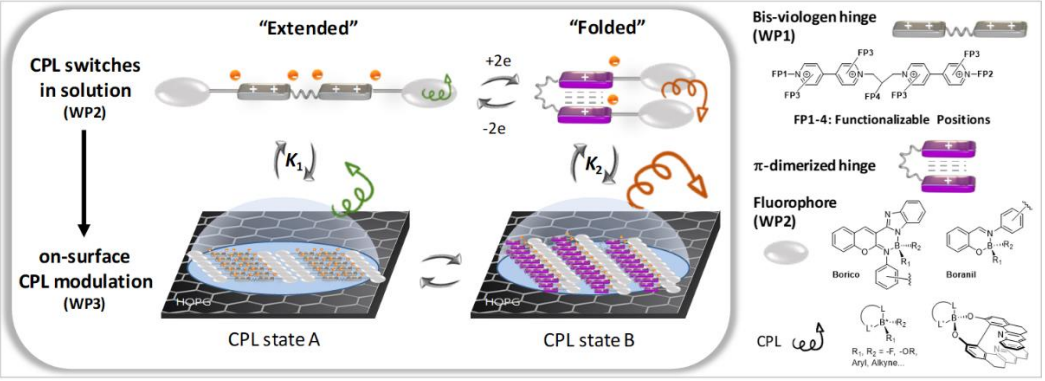

Figure 1. Schematic representation of metamorphic processes associated with modulation of chiroptical properties.

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