Switchable Molecules in Polymers and Anion Matrixes

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The synthesis of multifunctional materials is generally considered an important step from basic research to more application-oriented research.[1] One way to realize it are iron(II) spin crossover (SCO) complexes, whose spin state ($S = 0$ or $S = 2$) can be switched by a wide range of physical or chemical stimuli.[2] Structural and electronic changes associated with this transition can be exploited for different applications. In order to realise this, it is essential to synthesise nanostructures that can be integrated into composite materials, e.g., by the utilization of diblock copolymer (dBCP) micelles.[3,4] We will discuss the impact of crystal packing on the SCO properties with a focus on trapping effects in polymer or anion matrixes.[5]

To allow for a better readout, the combination of spin-state switching with switchable luminescence is desirable. Here we will show two different possibilities based on iron(II) SCO complexes[6] and nickel(II) complexes showing coordination-induced spin state switching (CISSS).[7] We will discuss which preconditions need to be fulfilled to observe luminescence for open-shell 3d metal centers[8] and how the different sensing units can be integrated into self-assembled dBCP micelles.

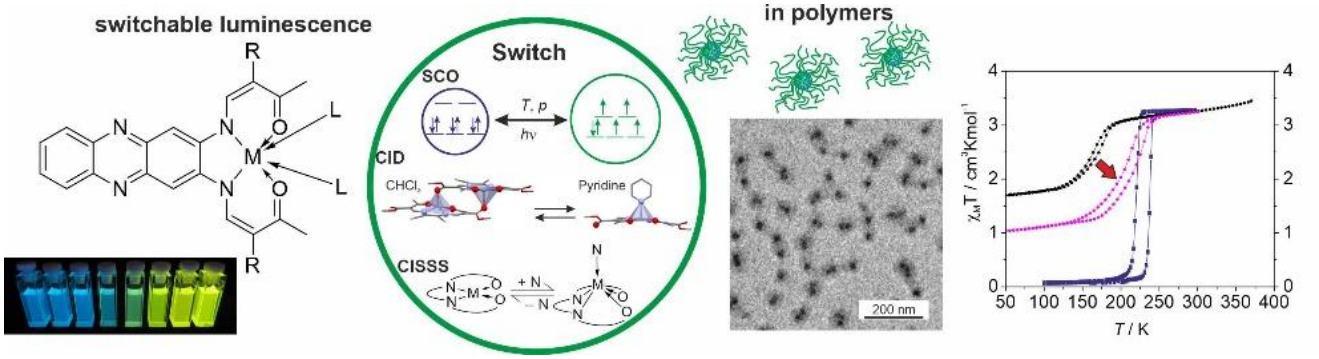

Figure 1. Different strategies to realize switchable molecules, their integration into polymers (right) and strategies to combine spin state switching with luminescence (left).

References

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