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# Switchable Molecular Tweezers as a Multifunctional Platform

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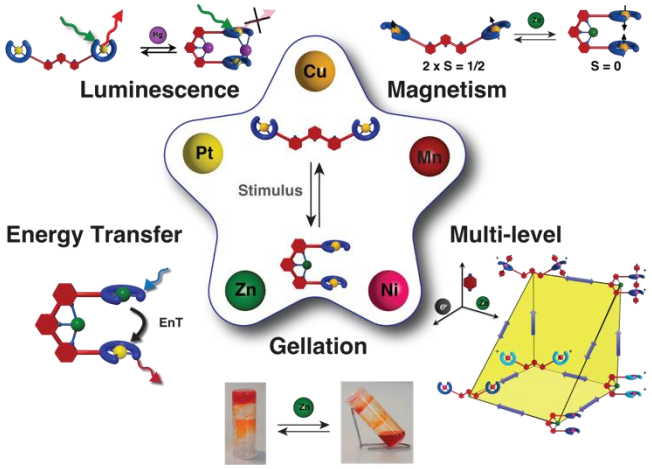
In recent years, artificial molecular machines[1] have attracted considerable attention due to their ability to control motion at the molecular level. However, they are far from achieving the complexity of their natural counterparts and fully harnessing their mechanical motion to perform useful functions remains a challenge. We are interested in exploiting the dynamic interconversion between distinct states to modulate physical and chemical properties at the molecular scale.

We have developed a family of switchable molecular tweezers based on a terpyridine ligand functionalized with metal-salen complexes.[2] In their open state, the tweezers adopt a 'W'-shaped conformation, which can be reversibly switched by a coordination stimulus to a 'U'-shaped conformation that brings the two M-salen complexes into close proximity. This drastic change in distance resulted in the modulation of luminescence[3] or magnetic[4] properties by incorporating Pt(II) or Cu(II)-salen complexes respectively. The modularity of our platform was further leveraged to integrate ion-triggered mechanical motion with the redox activity of Ni(II)-salen complexes, resulting in a remarkable six-level switch activated by three orthogonal stimuli.[5] More recently, we aimed to harness the structural reorganization of the tweezers to develop switchable organogels. A reversible sequential and time-controlled sol-gel transitions induced by the mechanical motion was achieved.[6] The allosteric regulation of energy transfer[7] in dissymmetric tweezers will also be highlighted.

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