

Sequence Control and Multi-stage Redox Composed of Single Metal Containing Metallosupramolecular Polymeric Films for Electrochromic Study

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Electrochromic (EC) materials and EC devices (ECDs) have always been regarded as a considerable developing research field. The well-regulated optical properties of EC materials have unique application in the field of solar control windows, e-displays, mirrors and camouflage materials. Compared with conventional EC materials such as WO_3 and viologens, the metallo-supramolecular polymers (MSPs) acquire various benefits, including simplistic film preparation, fast color change, high optical contrast and fine-tuning of the working potential by structure modification.^{1,2} MSPs, a new class of EC materials, have gained popularity and demonstrated advantages among them. Because of their high complexing action and robust metal-ligand charge transfer (MLCT) activity, terpyridine ligands are typically used in the MSP systems.

In this work, we propose a facile strategy to realize multistage electrochromism by designing and synthesizing a unsymmetric ditopic ligand. Using the ligands, we have prepared single metal containing MSP. The final MSPs have exceptional solubility and stability. Three reversible redox couples and color transformations are revealed by the MSP film upon different potential (Fig. 1). The EC performances of single metal MSP revealed continuous modulation over the visible region, high optical contrast, fast response time, high coloration contrast, outstanding cyclic reversibility, and optical memory time at once.

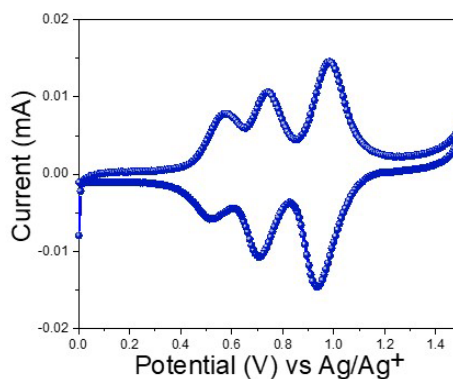


Fig.-1. A cyclic voltammogram of the MSP in 0.1 M LiClO_4 /acetonitrile.

References.

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