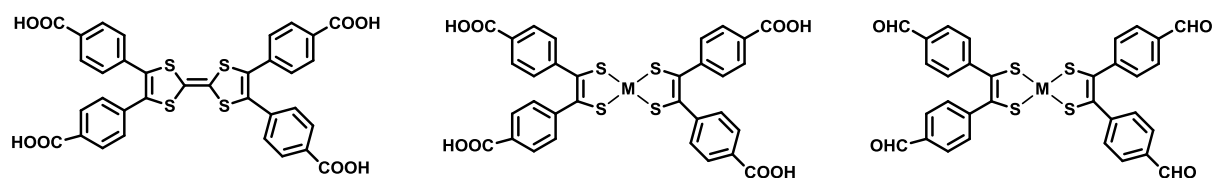


New 2D and 3D Redox-Active Coordination Polymers Based on Tetrathiafulvalene and its Derivatives

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With the rapid development of electronics, information science and material science, the design and synthesis of new multifunctional molecular materials with an interplay or synergy between two or more properties have attracted increasing attention. Tetrathiafulvalene (TTF), a sulfur rich π -conjugated core with two reversible and easily accessible oxidation states, can act as an effective linker to construct novel functional materials [1]. Particularly, materials possessing electrical and magnetic properties have received increasing interest due to the important applications in molecular spintronics.



Scheme 1 Redox-active units including TTF and its derivatives.

In our group, redox-active units including TTF and its derivatives (Scheme 1) are used to link magnetic centers to form interesting structures (especially new 2D and 3D coordination polymers) and multifunctional materials, such as magnetic semiconductors or magnetic conductors [2-4]. Chemical oxidation of the frameworks leads to pronounced variations in physical properties, demonstrating the significant potential for redox-modulated multifunctional behavior as the basis of new molecular electronics and magnetic devices. For examples, new type of photo- and electronically-switchable spin crossover Iron(II) Metal-Organic Frameworks (MOFs) have been studied [5]. High protonic and electrical conductivity was observed in 2D coordination polymers, and the pseudo-capacitance coupling mechanism offers a new strategy for utilizing the ionic conductivity from the type of materials [6]. Redox-active covalent organic frameworks with nickel-bis(dithiolene) units was used for high-performance lithium metal batteries [7].

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