

Multistage organic redox systems. Aromaticity as a guiding principle for materials chemistry

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Organic π -conjugated molecules capable of undergoing multistage redox processes have emerged as versatile platforms for applications in energy storage, molecular electronics, and optical devices. This review highlights the critical role of aromaticity in shaping the redox behavior of such systems. Structural factors including topology of the ring system, heteroatom incorporation, and conjugation pathways are examined with respect to their influence on redox ranges, stability, and properties of oxidation levels. The discussion encompasses monomeric aromatic systems and their linked and fused covalent assemblies with linear, branched, and cyclic topologies. The survey provides a unifying perspective on multiredox design principles, offering insights for future development of functional organic redox materials.

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