

# Redox Polymers for Energy Devices

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Redox-active polymers are characterized by a dense population of the electron-releasing and -gaining site that allows efficient redox-gradient driven electron- or charge-transport and -storage throughout the polymer layers via self-exchanging reactions. The redox sites are robust nitroxide and phenoxyl, quinones, viologen, etc. The polymers provide surprisingly high current density beyond  $1 \text{ A/cm}^2$ , to yield very rapid charging, high energy density storage and cyclability in the electrode performance. Organic-based, high-power and flexible batteries are the application examples. A polymer-based hydrogen carrier utilizing the reversible redox or hydrogenation is also introduced.

**Keywords** : Functional polymers, redox reaction, redox molecules, charge transport, charge storage, rechargeable batteries, hydrogen carriers