Quinone-based flow battery

Do quinones have redox properties for organic flow batteries?
Here,we report a systematic study on the electrochemical characteristics of quinones for organic flow batteries with a combined experimental and computational method. The redox properties of quinones were found to be strongly dependent on the molecular aromaticity and their electronic structures.

Can quinone-based flow batteries be adapted to alkaline solutions?
Dotted line represents CV of 1 M KOH background scanned at 100 mV/s on graphite foil electrode. We demonstrate that quinone-based flow batteries can be adapted to alkaline solutions,where hydroxylated anthraquinones are highly soluble and bromine can be replaced with the nontoxic ferricyanide ion (8,9)--a food additive (10).

Are alkaline flow batteries safe?
We report an alkaline flow battery based on redox-active organic molecules that are composed entirely of Earth-abundant elements and are nontoxic,nonflammable,and safefor use in residential and commercial environments. The battery operates efficiently with high power density near room temperature.

Can a non aqueous flow battery reduce potential?
In addition, the potential is constrained by the electrolysis of water in aqueous flow batteries. In contrast, a non-aqueous flow battery can avoid these constraints by taking advantage of the high solubility of quinones in aprotic electrolyte with a wide potential window.

Can Quinones be dissolved in alkaline solutions?
Lin et al. show that quinones can be dissolved in alkaline solutionsand coupled with ferricyanides to make a flow cell battery (see the Perspective by Perry). This gives scope for developing flow cells with very low costs,high efficiencies at practical power densities,simplicity of operation,and inherent safety.

How do flow batteries work?
Flow batteries,in which the redox active components are held in tanks separate from the active part of the cell,offer a scalable route for storing large quantities of energy. A challenge for their large-scale development is to avoid formulations that depend on toxic transition metal ions.

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