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Toward Fully Plastic Batteries: Electroactive Polymer-Carbon Composite Electrodes for Rechargeable Batteries

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Fast recharging, flexible, small, light-weight, and environmentally compatible batteries with high power and energy capacities are required more than ever to meet the demands of today's booming portable device and electric vehicle industries. NiMH and Li-Ion batteries of today cannot provide these features simultaneously. Fully plastic batteries incorporating polymer electrodes and polymer electrolytes only in their cells are good candidates once suitable polymer electrodes and electrolytes are developed. To answer these challenges new redox active polymer based electrodes with pendant electro-active groups such as TEMPO and quinone derivatives have been synthesized and characterized. Batteries with energy capacities 200 -300 mWh/g have been obtained. Recent advances[1-7] in the field of utilization of organic and polymeric electro -active materials are promising a bright future for polymer based rechargeable batteries.

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