

Low-Cost Quinone Oligomers for High Power Lithium-Ion Battery Cathodes

Research Themes

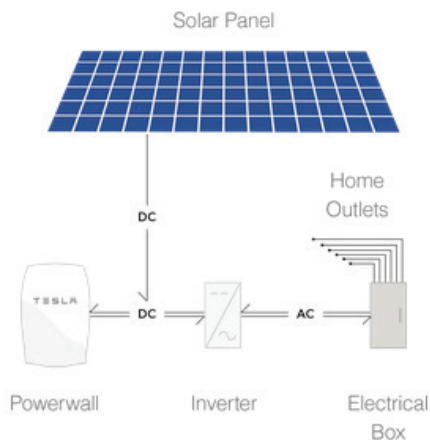
1. Design, synthesis and characterization of organic electrode materials with high charge density
2. Evaluation of electrochemical behaviors of organic materials in aqueous/nonaqueous electrolytes
3. Organic material based battery tests in aqueous/nonaqueous electrolytes
4. Fundamental study of redox polymers for rechargeable batteries

Recent Accomplishments

1. Three novel quinone based polymers are developed towards sustainable energy storage
2. Structure-property relationships are discovered
3. Our new developed organic electrodes deliver >200 mAh/g of specific capacities
4. Cross-conjugation, swelling effect, pKa constant, ionic dynamics, solvation etc. scientific issues are revealed

Issues

1. Synthesis cost in terms of materials and time
2. Limited characterization methods for insoluble polymers
3. Dissolution of active materials and mechanical failure lead to performance degradation



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