KEEPING UP WITH BATTERIES

We have sifted through >1000 of articles on Li-ion batteries for you! We have captured pretty much everything new and relevant that came out in September 2018. We have carefully selected and categorized each article, added some interesting news, and squeezed all this content into our comprehensive review.

Hope it makes your work easier and keeps you in touch with battery literature!

The Research Interfaces Team

CELL COMPONENTS & MANUFACTURING

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<thead>
<tr>
<th>Article</th>
<th>Journal</th>
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<tbody>
<tr>
<td>Li-ion battery safety</td>
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<td>Impact of different electrode coating defects on cell performance</td>
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<td>Processing vs surface free energy of composite electrodes</td>
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<td>Cost evaluation of EV cathodes operating at high voltages</td>
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<td>Economic and environmental evaluation of cathodes for EV batteries</td>
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<td>Si composite slurry mixing using ZrO₂ balls</td>
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<td>Optimizing parameters of spray-printed battery electrodes</td>
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<td>Fabrication of flexible Ni current collector by inkjet printing</td>
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<td>3D printing of complete Li-ion battery using FFF printer</td>
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<td>Microwave reactors for synthesis of nanomaterials</td>
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<td>Nanocomposite materials produced by electrospinning</td>
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LEGEND

- link to the article or website
- OA/review/highlight article
- work led by industry/national lab
- led by prominent company or government/academic research lab

TYPES OF LI-ION BATTERIES

- application / Li-ion chemistry
- electric vehicles / grid storage
- recycling / resources
- Si, G, LiM, LTO... — anode chemistries
- NMC, NCA, LFP... — cathode chemistries

*Other abbreviations are chemistry or engineering specific and commonly used throughout the field (e.g. KF = Kalman filter). If you are unclear, please click on the link and check.

**Mistakes are unavoidable, so please forgive us if you find any.

CELL BEHAVIOR

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<td>Thermally-induced failure of Li-ion cell modelled by COMSOL</td>
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<td>Composite tshell elements for accelerated battery safety simulations</td>
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Models of Li-ion battery aging in different scales

Numerical study of T-dependent aging behavior of Li-ion cell

OCV–SoC characteristics of 75Ah battery at different T

Performance of 20Ah Li-ion pouch cell cooled by cold plates

Effect of dynamic impacts on behavior and aging of LCO cells

Effect of packaging/cooling plates on mechanical failure of EV module

Influence of AC current ripples on life-time of Li-ion cells

Separated impedance spectra of anode and cathode via 3-electrode cell

Interfacial resistance between cathode and current collector by EIS

Nonlinear electrochemical impedance spectroscopy of Li-ion cell

Optimizing formation protocols for NMC811/graphite cells

Consumer-based evaluation of commercially available 18650 cells

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**NEWS BOX**

The World Bank Just Placed a $1 Billion Bet on Batteries ([Fortune](https://www.fortune.com/))

"The World Bank will offer loans up to $1 billion and seek partners for an additional $4 billion to finance batteries in the developing world."

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A "Technology-Smart" Battery Policy Strategy for Europe ([Science](https://www.sciencemag.org/))

"Europe houses less than 1% of the global Li-ion battery cell manufacturing capacity, and this production capability largely addresses niche markets."

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Argonne's Joint Center for Energy Storage Research Renewed for 5 Years ([Energy.gov](https://energy.gov/))

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**BATTERY MANAGEMENT**

 Models of Li-ion battery aging in different scales

Method for predicting critical temperature of Li-ion cell

Nonlinear electrochemical impedance spectroscopy of Li-ion cell

Fast charging method with time-varying current

SoH and RUL estimation methods for EV battery

Comparison of lumped diffusion models for voltage prediction

Estimation of model parameters using universal adaptive stabilizer

Validating ECMs at low ambient temperatures

State estimation using fractional-order ECM

Comparison of co-estimation methods for online SoC

Online identification of parameters and SoC estimation using DUKF

SoC and model parameters estimation using HEKF
| Nonlinear T-dependent state model for SoC estimation with EKF | MDPI |
| SoC estimation based on EKF and EC-based ECM | MDPI |
| SoC estimation using physically-based impedance model | IEEE |
| SoC estimation via frequency-dependent capacitance | MDPI |
| SoC estimation using adaptive estimator | Elsevier |
| SoC estimation based on parameter adaptive method with dead zone | Elsevier |
| SVR algorithm for ICA-based SoH estimation | MDPI |
| SoC prediction of Li-polymer battery for HEV | MDPI |
| Aging and SoH of second-life LFP batteries for energy storage | Elsevier |
| Parameter identification of battery pack based on CRB analysis | Elsevier |
| Comparison of different resampling algorithms for RUL prognosis | Elsevier |

### BATTERY MODULES & PACKS

| Li-ion battery safety book | Elsevier |
| Insulation fault diagnosis for EV battery pack | Elsevier |
| Effect of packaging/cooling plates on mechanical failure of EV module | Elsevier |
| Influence of cell-to-cell variations on inhomogeneity of battery module | ECS |
| Statistics-based fault detection of series-connected EV battery pack | Elsevier |
| Balancing of battery strings using mesh-structured SCE | IEEE |
| Dynamics of current distribution in parallel-connected battery cells | Elsevier |
| Understanding cell variations in battery pack due to T non-uniformity | Elsevier |
| Hybrid characterization of battery packs based on time and frequency | Elsevier |
| Cell selection and grouping method for second-life cells | Elsevier |
| Simulation platform for optimization of EV modular drivetrains | IEEE |
| Thermal management systems for modular EV battery packs | Elsevier |
| Optimizing control variables in TMS using design of experiments | Springer |
| Thermal and energy management based on bimodal T sensing and ML | MDPI |
| Transient thermal behavior of open vs confined air-flow module | Elsevier |
| Integrating jet inlets and vortex generators to improve pack air cooling | ASME |
| Review of PCM- and TEC-based thermal management systems | Elsevier |
| Comparing FAC and SP heating strategies for PCM-based battery pack | Elsevier |
| TMS based on PCM-fin structure | Elsevier |
| TMS for AUV based on paraffin PCM | Elsevier |
| TMS based on serpentine-channel cold plate | Elsevier |
| Performance of 20Ah Li-ion pouch cell cooled by cold plates | MDPI |
| Internal AC/DC self-heating strategy for EV battery pack | Elsevier |
NEWS BOX

Mercedes Unveils Electric Car in Direct German Challenge to Tesla (Reuters)

Elon Musk Steps Down as Tesla Chairman in $40 Million SEC Settlement (Time)

States, Cities and Companies Unveil a Frenzy of New Electric Vehicle Commitments (Greentech Media)

BATTERY APPLICATIONS

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<td>Springer</td>
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<td>Energy management strategy for battery/SC system in PHEV bus</td>
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<td>TEA diagram for cost and emission comparison of hybrid and EV</td>
<td>MDPI</td>
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<td>Active stabilization of bidirectional EV battery charger</td>
<td>IEEE</td>
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<tr>
<td>MMPC for bidirectional power control between EV and grid</td>
<td>IEEE</td>
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Charging solutions for everyday EV mobility | Springer |
Charging management for EVs using generalized Nash equilibrium | Wiley |
Mixed user equilibrium model of EV charging in urban network | Elsevier |
Charging control of EVs in smart grid using Stackelberg differential game | Springer |
Incentive-based distributed scheduling of EV charging | IEEE |
Consensus-based coordination of EV charging | Elsevier |
Emissions of centralized vs decentralized EV smart charging | Elsevier |
Effect of opportunity charging on costs/CO₂ of urban freight transport | MDPI |
Locating and sizing of battery swapping stations | Elsevier |
Multi-objective locating of EV battery swapping stations | Elsevier |
Dial-a-ride problem with EVs and battery swapping stations | Elsevier |
Analysis of EV driving patterns via two-level clustering model | Elsevier |

Modular approach for electrification of city bus fleets | Springer |
Planning EV infrastructure for urban areas with tight land supply | MDPI |
Placing EV charging stations using time cost and existing infrastructure | MDPI |
Integration of EVs into power grid for demand response | Elsevier |
Evaluating impact of EVs on grid assets using integrated algorithm | Elsevier |
Resolving grid congestion in Germany using V2G technology | Elsevier |
### Transportation and power grid in smart cities
- **Wiley**

### Past and future industrial use of lithium in EU context
- **MDPI**

### Different aspects of energy storage
- **IEEE**

### Optimizing demand-side ESS in presence of distributed generation
- **IEEE**

### Coordinated control of multiple BESS for primary frequency regulation
- **IEEE**

### Dual battery storage strategy for PV utilization in UK
- **MDPI**

### Sizing of residential battery/PV system in Australia
- **Elsevier**

### Optimizing dispatch of integrated battery/PV system
- **IEEE**

### Energy management algorithm for battery/PV system
- **IEEE**

### Optimization model for battery/PV systems in P2P energy trading
- **Elsevier**

### Economic evaluation of second-use battery/PV charging station
- **Elsevier**

### Key environmental and performance indicators for battery/RE system
- **Elsevier**

### Optimizing size and control of off-grid battery/RE system
- **Elsevier**

### Energy management for battery/wave energy system
- **Elsevier**

### Techno-economic analysis of Li-ion vs Pb-acid battery in microgrids
- **Elsevier**

### Design of multi-energy microgrid using linear battery aging model
- **Elsevier**

### Energy management and battery sizing for Flinders Island microgrid
- **Elsevier**

### LCA and cost-benefit analysis of BSS for small energy communities
- **MDPI**

### Techno-economic analysis of DC distribution in commercial buildings
- **Elsevier**

### RECYCLING

#### Processes and technologies for recycling of spent Li-ion batteries
- **Springer**

#### Hydrometallurgical processes for recycling spent Li-ion batteries
- **ACS**

#### Recovery of Li, Co, Ni, Mn from cathode scrap by leaching
- **Elsevier**

#### Recovery of high-purity Co from NMC battery by leaching
- **Springer**

#### Leaching and precipitation of Li and Co using tartaric acid
- **Elsevier**

#### Effect of mechanochemical activation on LCO powder and metal leaching
- **ACS**

#### Recovery of metals from NMC cathode using H$_2$SO$_4$ leaching
- **Elsevier**

#### Recovery of Mn from H$_2$SO$_4$ leaching liquor
- **Elsevier**

#### Selective extraction of Li using mild H$_3$PO$_4$
- **Elsevier**

#### Techno-economic optimization of battery metal recovery by acid leaching
- **Elsevier**

#### Recovery of Li from pyrometallurgical slag by chlorination roasting
- **ACS**

#### Coupling reactions during roasting of mixed anode and cathode
- **Elsevier**

#### Computational selection of LiMO ion exchange materials for Li extraction
- **ACS**

#### Recovery of NMC cathode material from different recycling streams
- **ACS**

#### Regeneration of NMC532 cathode material from spent batteries
- **Elsevier**

#### Closed-loop process to resynthesize LiCoO$_2$ from spent phone batteries
- **Elsevier**

#### Economic and environmental benefits of EV recycling in China
- **Elsevier**
NEWS BOX

Electric Flight Will Transform Our Cities for the Better, and It Will Happen Sooner Than You Think (Greentech Media)

“This trio of storage, sensors and software came together to build today’s $6 billion commercial drone industry. Only 10 years ago, it barely existed. Once drones are allowed to fly beyond visual line-of-sight, the market is expected to grow at an even faster pace.”

New Electric Drone Has Groundbreaking Flight Time (IEEE Spectrum)

Industry Giants Samsung and Hyundai Invest in Solid-State Batteries (Greentech Media)

Why Lithium-ion May Rule Batteries for a Long Time to Come (MIT Technology Review)

“For anything to make it into a commercial product is a long slog, even if you make the discovery faster. It’s just a very long road to materials optimization, testing, customer acceptance, all of these things. To the point that even if I had something that worked perfectly in the lab today, you would probably have a six-to-10-year slog.”