












KEEPING UP WITH BATTERIES

We have sifted through 1000s 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

 ANODE					
Advanced electrodes, separators and electrolytes for Li-ion battery	RSC				
Determining electrode tortuosity based on diffusivity vs conductivity	ECS				
★ Water-based binders and their effect on SEI of graphite anode	ACS		G		★
Effect of SEI properties on degradation of graphite anode	ECS		G		
Understanding phase transition from LiC ₁₂ to LiC ₆ in graphite anode	ACS	 	G		
Quantifying anode changes in aged NMC532/graphite pouch cell	ECS		G		
Laser-fabricated porous electrodes for improved rate performance	Elsevier	 	G		
Electrochemical intercalation of Li ⁺ into graphene-like graphite	ECS		G		
Behavior of PVDF binder in Si-graphite composite anode	ACS		Si-G		
Water-soluble PAL-NaPAA binder for micro-Si anode	ACS		Si thin film		
Nanoporous ZnO matrix for Si composite anode	ACS		Si		
Diffusion of Li atoms in Si anode simulated by Monte Carlo	AIP		Si		
Nucleation and growth of Li-Si alloys on crystalline Si surfaces	Wiley		Si		
Co-deposition of Ti and Si for improved stability of Si thin-film anode	Wiley		Si thin film		
Slurry-mixing using ZrO ₂ balls for Si composite anode	Elsevier		Si		
★ Interactions between Li dendrites and nanoporous ceramic separators	Elsevier		LiM		★
Localisation of Li dendrites in battery separator via CEPRI	Nature		LiM		
Understanding dendrite-SEI interactions in Li-metal anode	RSC		LiM		
Function of different SEI nanostructures in Li-metal cell performance	Elsevier		LiM		
Studying Li-metal SEI in different electrolytes via XPS and EDX	ACS	 	LiM		
★ Controlling Li nucleation in low LiPF ₆ concentration electrolyte	Elsevier		LiM		★
Deposition/stripping of Li studied by continuum mechanics simulation	ACS		LiM		
Optimizing micro-pattern on Li-metal surface to improve plating/stripping	Elsevier		LiM		
Langmuir-Blodgett artificial SEI for Li-metal anode	Nature		LiM		
Mixed ionic/electronic conductor interphase on Li-metal anode	Wiley		LiM		
Effects of T and pressure on stability and kinetics of Li/polymer interface	ECS		LiM		
Lithophilic-lithiophobic gradient interfacial layer for Li-metal anode	Nature		LiM		
Combinatorial analysis of surface coatings on Li-metal anode	ECS		LiM		
Nafion/LiCl-coated Li-metal anode	Elsevier		LiM		

Studying SEI of $\text{Li}_4\text{Ti}_5\text{O}_{12}$ anode cycled with NMC vs LMO cathodes	ECS		LTO
Sodium alginate binder for water-based $\text{Li}_4\text{Ti}_5\text{O}_{12}$ processing	Elsevier		LTO
Calculating electrochemical properties of lithiated Co_3O_4 anode	RSC		TMO
Carbon anode with P-O bond	ACS		C
Mo and W chalcogenides for Li-ion batteries	Elsevier		
2D metal carbides and nitrides (MXenes) for Li-ion batteries	Wiley		
2D-pnictogens as anode materials for Li-ion batteries	RSC		
Effect of particle 1D/2D nanostructure on electrode performance	Springer		

LEGEND

- link to the article or website
- industry/government co-author
- type of Li-ion battery
- open access
- review article / highlight

TYPES OF LI-ION BATTERIES
























- Si – silicon anode | G – graphite anode
- SSB – solid-state Li-ion battery
- LiPo – lithium polymer battery
- TMO, MPO₄... – transition metal oxide, metal phosphate... anode/cathode chemistries
- LFP, NMC, NCA... – cathode chemistries

*Other abbreviations are chemistry or materials specific and commonly used throughout the field (such as chemical elements and formulas). If you are unclear, please click on the link and check.

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

ELECTROLYTE

★ Structural mechanisms of Li^+ mobility in LiPON electrolytes	ACS		SSE	★
Impact of solid electrolyte properties on Li dendrite growth	ECS		SSE _{LIM}	
Effect of dopants on dendrite formation in LLZO electrolytes	RSC		SSE	
Li_xMO_y compounds for compensating Li loss during LLZO sintering	Elsevier		SSE	
Polymer-coated garnet electrolyte for all-solid-state cell	Elsevier		SSE _{LFP/LIM}	
LiF and HFE for improved sulfide electrolyte/Li-metal interface	Elsevier		SSE _{LiCo/LiM}	
★ Gas evolution in thiophosphate/NMC all-solid-state cell	ACS		SSE _{NMC/LTO}	★
Solid halide electrolyte for 4V all-solid-state cell	Wiley		SSE _{LiCo}	
Studying Li^+ diffusion in perovskite LLTO electrolyte at 20-100°C	Elsevier		SSE	
Li^+ conducting plastic crystal solid electrolyte	Wiley		SSE	
Heterojunction quasi-solid electrolyte with immiscible phases	RSC		SSE	
Effects of T and pressure on stability and kinetics of Li/polymer interface	ECS		LiPo _{LIM}	
Understanding degradation of PEO-LiTFSI-based solid-state cells	RSC		LiPo	
Charge distribution in PEO-based electrolyte using KPFM	Elsevier		LiPo	
PMHS-PEO blend polymer electrolyte for solid-state cell	RSC		LiPo _{LFP/LIM}	
PEO-P ₁₂ FSI-based polymer electrolyte for solid-state cell	ACS		LiPo _{LFP/LIM}	
Architected macroporous polyelectrolyte for Li dendrite suppression	ACS		LiPo _{LIM}	
Dual-crosslinking of polymer electrolyte to improve stability	Wiley		LiPo _{LFP/LIM}	
★ Reversible thixotropic gel electrolyte for factor-free pouch cell	Elsevier		LiPo	★
IL-immobilized P(VDF-HFP) gel electrolyte with self-healing capability	Elsevier		LiPo _{LFP/LIM}	
Advanced electrodes, separators and electrolytes for Li-ion battery	RSC			
★ Exploring classes of co-solvents for fast-charging NCA cells	ECS		NCA/Si-G	★

pyr _{1,2} FSI as electrolyte co-solvent for Si-anode cell	Elsevier		Si	
Li ₃ AlF ₆ additive for Li-metal cell	ACS		LFP/LiM	
Diethylenetriamine additive for Li-metal cell	Elsevier		LiM	
LiNO ₃ additive in carbonate electrolyte for Li-metal cell	Nature		NMC/LiM	
LiBOB additive for improved stability of LiNi _{0.94} Co _{0.06} O ₂ cathode	Wiley		LNCO/G	
ADN additive for HV LNMO cathode	ACS		LNMO	
bis-TMSA additive for Li _{1.2} Ni _{0.2} Mn _{0.6} O ₂ cathode	Elsevier		LLO	
LiBFEP additive for HV LNMO/graphite cell	ECS		LNMO/G	
FEC additive for NMC622/ and LCO/Si-G pouch cell	ECS		NMC, LCO/Si-G	
Dioxazolone and nitrile sulfite additives for NMC/graphite pouch cell	ECS		NMC/G	
S-based additives for LCO/graphite cell	ECS		LCO/G	
Concentrated LiFSI and LiODFB dual-salt electrolyte	Elsevier		LFP/LiM	
Solvation behavior of LiBF ₄ and LiTFSI in adiponitrile for HV electrodes	RSC			
Controlling Li nucleation in low LiPF ₆ concentration electrolyte	Elsevier		LiM	
Quantification of PF ₅ and POF ₃ from decomposition reactions of LiPF ₆	ECS			
Comparing methods for measuring electrolyte transference numbers	ECS			
★ Combinatorial screening of electrolytes for Li-metal anode	ECS		LiM	 ★
Pseudo-concentrated electrolyte for HV battery chemistry	ACS			
EC-free electrolytes for HV graphite-based batteries	Springer		G	
Poly(ionic liquid) electrolyte for high T cell operation	ACS		LFP/LiM	
SL/EMC/FEC electrolyte for 5V LNMO/Si pouch cell	Elsevier		LNMO/Si	
Quantifying electrolyte changes in aged NMC532/graphite pouch cell	ECS		NMC/G	
Dissolution behavior of LFP and LCO in aqueous solutions	Wiley		H ₂ O	

NEWS BOX



The World Bank Just Placed a \$1 Billion Bet on Batteries ([Fortune](#))

"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."

A "Technology-Smart" Battery Policy Strategy for Europe ([Science](#))

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

Argonne's Joint Center for Energy Storage Research Renewed for 5 Years ([Energy.gov](#))

SEPARATOR



Advanced electrodes, separators and electrolytes for Li-ion battery

[RSC](#)



★ Interactions between Li dendrites and nanoporous ceramic separators

[Elsevier](#)

LiM



PVdF-HFP/IL separator by hot pressing	ACS		LFP/LiM
Octaphenyl-POSS/PMIA composite separator by electrospinning	Elsevier		LCO/LiM
AlOOH-coated PI separator by electrospinning and blade-coating	Springer		LCO/LiM
Fluorinated PEEK separator by electrospinning	Elsevier		
PAN micro/nanofiber separator by electrospinning	Elsevier		NMC/LiM
SiO ₂ -PAN/PAN-PU dual-layer micro/nanostructured separator	Elsevier		LFP/LiM
ZnO NPs as filler and foaming agent for gel polymer separator	Elsevier		LFP/LiM

CATHODE



★ Surface and subsurface reactions of TMO cathode materials	Wiley		TMO	★
Growth of Ni _{1/3} Mn _{1/3} Co _{1/3} (OH) ₂ precursor during NMC synthesis	ECS		NMC	
★ Investigating mesoscale morphological defects in NMC622 particles	Elsevier		NMC	★
Propagation of NMC phase transition from surface into bulk lattice	ACS		NMC	
Effect of Li silicate coating on crack formation in NMC532 cathode	Elsevier		NMC	
Temperature dependence of O ₂ release from NMC622 cathode	ECS		NMC	
MnPO ₄ -coated NMC622 cathode for elevated T and HV operation	Elsevier		NMC	
Li ₃ VO ₄ -PPy surface coating of HV NMC622 cathode	Elsevier		NMC	
LiF-coated NMC532 cathode using LiPF ₆ precursor	ACS		NMC	
PAA-coated Li-rich NMC cathode	RSC		NMC	
Li ₄ SiO ₄ -coated NCA cathode	Elsevier		NCA	
Effects of cut-off V ranges and kinetic hindrance in NCA cathode	ECS		NCA	
Gas evolution in thiophosphate/NMC all-solid-state cell	ACS		NMC, SSB	
Advanced electrodes, separators and electrolytes for Li-ion battery	RSC			
★ Comparing O ₂ release and surface degradation in Li-rich cathodes	ECS		LLO	★
First-cycle simulation for Li-rich xLi ₂ MnO ₃ ·(1-x)LiMO ₂ cathode	ECS		LLO	
Li _{1.2} Mn _{0.6} Ni _{0.2} O ₂ with bicontinuous ionic and electronic pathways	Elsevier		LLO	
LiAlF ₄ coating of LNMO cathode	ACS		LLO	
Surface modification of Li _{1.2} Mn _{0.56} Ni _{0.16} Co _{0.08} O ₂ by supercritical CO ₂	ECS		LLO	
Structure and electrochemistry of Li _x NiO ₂ cathode (for 0 ≤ x ≤ 1)	ECS		LNO	
Decoupling fracture-induced degradation in spinel Li _x Mn ₂ O ₄ cathode	ECS		LMO	
Monitoring reaction between LMO spinel and Li ₂ MnO ₃ under heat	Elsevier		LMO	
Mechanism of Al ₂ O ₃ ALD growth on LiMn ₂ O ₄ cathode	Elsevier		LMO	
Effects of SEI-generated gases on fade of LMO and LCO cells	ECS		LMO, LCO	
Spinel-structured LiCo _x Mn _{2-x} O ₄ cathodes for cell stability at high T	ACS		LCMO	
Short-range order and Ni redox in F-doped disordered rocksalt cathode	ACS		LTMO	
Degradation mechanism in Li[Li _{1/6} Fe _{1/6} Ni _{1/6} Mn _{1/2}]O ₂ cathode	Wiley			
Redox process in Li _{1+z/3} Ni _{1/2-z/2} Ti _{1/2+z/6} O ₂ rock salt-type cathode	Elsevier			
★ Effect of surface diffusion on intraparticle phase transformation	Nature		LFP	★
Impact of antiphase boundaries on Li diffusion in LiCoO ₂ cathode	ACS		LCO	
HV performance of TiO ₂ -coated LiCoO ₂ by single particle measurement	Elsevier		LCO	
Dissolution behavior of LCO and LFP in aqueous solutions	Wiley		LCO, LFP	

Combining LCO and NMC622 cathodes in Si-G pouch cell	ECS		LCO, NMC		
Performance of LiCoPO ₄ made using aqueous binders	Elsevier		MPO ₄		
Fe ³⁺ substitution of HV LiCoPO ₄ cathode	ACS		MPO ₄		
K ⁺ and Zr ⁴⁺ co-doped LiVPO ₄ F/C cathode	Elsevier		MPO ₄		
Role of disorder in limiting multi-electron redox in ε-LiVOPO ₄ anode	RSC		MPO ₄		
Chemo-mechanical behavior of V ₂ O ₅ cathode during cycling	Elsevier		TMO		
★ Interfacial resistance between cathode and current collector by EIS	Elsevier				★
Determining electrode tortuosity based on diffusivity vs conductivity	ECS				
Laser-fabricated porous electrodes for improved rate performance	Elsevier		LFP		
Q 2D metal carbides and nitrides (MXenes) for Li-ion batteries	Wiley				
Effect of particle 1D/2D nanostructure on electrode performance	Springer				
Economic and environmental evaluation of cathodes for EV batteries	Springer				chapter



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](#))



DEVICES, FABRICATION & CHARACTERIZATION



★ Interlocking component architecture for flexible batteries	Wiley				★
3D printing of complete Li-ion battery using FFF printer	ACS		SSB		
Optimizing parameters of spray-printed battery electrodes	Elsevier				
Laser-fabricated porous electrodes for improved rate performance	Elsevier		G		
Artificial SEI for Li-metal anode using Langmuir–Blodgett method	Nature		LiM		
Reversible safety switch for overcharging of Si-anode cell	Elsevier		Si		
Fabrication of flexible Ni current collector by inkjet printing	MDPI				
Q Nanocomposite materials produced by electrospinning	Elsevier				
Q Electrospinning of nanofibers and nanocomposites	Elsevier				
Q Microwave reactors for synthesis of nanomaterials	MDPI				
Q ★ X-ray tomography for battery research and development	Nature				★
Nano-CT visualization of electrodes using contrast-enhancing agent	ACS				
Probing chemical non-uniformities of Li-ion cell by HE-XRD	Elsevier		LCO/G		
Elemental mapping for electrodes and separators via LA-ICP-MS	Springer				
Localisation of Li-metal dendrites in battery separator via CEPRI	Nature		LiM		

Function of different SEI nanostructures in Li-metal cell via cryo-EM	Elsevier		LiM	
Effect of electrolyte on Li-metal SEI studied by XPS and SEM-EDX	ACS		LiM	
Probing electrolyte solvation structure at solid-liquid interface by SERS	ACS			
Understanding charge distribution in polymer electrolyte using KPFM	Elsevier		LiPo	
Studying Li ⁺ diffusion in perovskite LLTO electrolyte using ⁷ Li NMR	Elsevier		SSE	
Degradation mechanism in LFNMO cathode via HAADF-STEM and XPS	Wiley			
Chemo-mechanical behavior of V ₂ O ₅ cathode using DIC	Elsevier			
Separation of impedance spectra of anode/cathode via 3-electrode cell	Elsevier		NMC/G	
Nonlinear electrochemical impedance spectroscopy of Li-ion cell	ECS		NMC/G	
Analysis of electron energy-loss near-edge structures in battery materials	RSC			

MODELING & FUNDAMENTALS

★ Computational design of materials and interfaces for solid state cell	Elsevier					★
★ Structural mechanisms of Li ⁺ mobility in LiPON electrolytes using MD	ACS					★
★ Degradation of PEO-LiTFSI-based solid-state cells via DFT	RSC					★
Continuum mechanics simulation of deposition/stripping of Li metal	ACS					
Diffusion of Li atoms in Si anode simulated by kinetic Monte Carlo	AIP					
FP calculation of electrochemical properties of lithiated Co ₃ O ₄ anode	RSC					
First-cycle simulation for Li-rich xLi ₂ MnO ₃ ·(1-x)LiMO ₂ cathode	ECS					
Modelling electric double layer at electrode-electrolyte interfaces	Elsevier					
Multi-physics model of porosity evolution due to solid-fluid interaction	ECS					
Numerical study of microscale model for Li-ion battery	Elsevier					
Multi-scale model of pouch cell with reduced computational time	ECS					
Models of Li-ion battery aging in different scales	Elsevier					
Fundamental confusion between supercapacitor vs battery storage	Elsevier					
Determining electrode tortuosity based on diffusivity vs conductivity	ECS					
Understanding dendrite-SEI interactions in Li-metal anode	RSC					LiM
★ Interactions between Li dendrites and nanoporous ceramic separators	Elsevier					LiM ★
Understanding phase transition from LiC ₁₂ to LiC ₆ in graphite anode	ACS					G
Comparing methods for measuring electrolyte transference numbers	ECS					
Effect of surface diffusion on intraparticle phase transformation	Nature					LFP
Propagation of NMC phase transition from surface into bulk lattice	ACS					NMC
Short-range order and Ni redox in F-doped disordered rocksalt cathode	ACS					LTMO
Single particle measurements of TiO ₂ -coated LiCoO ₂ cathode	Elsevier					LCO
★ Impact of space-charge layers on performance of all-solid-state cell	ACS					SSE ★
Analysis of electron energy-loss near-edge structures in battery materials	RSC					

OTHER BATTERY TECHNOLOGIES

Electrochemical engineering: From discovery to product	Wiley					book
Organic small molecules and polymers as Li-ion electrode materials	RSC					Li-ion
Graphene and CNTs for advanced Li-ion batteries	I&E					Li-ion book

Q Inorganic fluorinated carbons in primary Li-ion batteries	RSC		Li-ion	Q
Q Graphitic carbon materials for Na-ion batteries	Wiley		Na-ion	Q
Q Mixed polyanionic cathode materials for Na-ion batteries	Wiley		Na-ion	Q
Q Cathode materials for non-aqueous K-ion batteries	Springer	🏛️	K-ion	🔒 Q
Q Electrode materials for rechargeable Zn-ion batteries	ACS		Zn-ion	Q
Q Zn dendrite inhibition for Zn-based batteries	Wiley	🏛️		Q
Q Electrolyte and electrode materials for aqueous batteries	Wiley			Q
Q Electrically conductive hydrogels for flexible energy storage	Elsevier			Q
Q MOF membranes: Production, modification, and applications	Elsevier			Q
Q MOF-based materials for Li-S batteries	Elsevier		Li-S	Q
Q Selection and structural design of polymers for Li-S batteries	Elsevier		Li-S	Q
Q Metal-air batteries: Fundamentals and applications	Wiley		M-O ₂	book
Q Sodium superoxide-based Na-O ₂ batteries	Wiley	🏛️	Na-O ₂	Q
Q Potassium superoxide as alternative for metal-air batteries	ACS		K-O ₂	Q
Chemical energy storage between faradaic and capacitive technologies	RSC	🏛️	SC	🔒
Q Design and mechanisms of asymmetric supercapacitors	ACS		SC	Q
Q Development, design and applications of structural capacitors	Elsevier		C	Q

📱 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."