

Curated Research Articles

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- **Dampening Lithium Charge Density by Clustering Solvents and Anions to Tame Lithium De-Coordination Energy for Low-Temperature Lithium-Metal Batteries** — score: 1.000 This article explores how cluster solvates enhance lithium transport kinetics in low-temperature lithium-metal batteries by altering lithium charge density. The study shows that lithium nitrate's electron-donating properties weaken lithium's interaction with triethyl phosphate, reducing de-coordination energy and improving charge exchange at the interface, thus accelerating lithium ion movement. This research provides insights into optimizing electrolyte components for better battery performance. Journal: *Wiley: Advanced Energy Materials: Table of Contents*
- **Redox chemistry of LiCoO₂, LiNiO₂, and LiNi_{1/3}Mn_{1/3}Co_{1/3}O₂ cathodes: Deduced via XPS, DFT+DMFT, and charge transfer multiplet simulations** — score: 1.000 The article investigates the redox chemistry of lithium cobalt oxide, lithium nickel oxide, and a specific lithium nickel manganese cobalt oxide composite. Through techniques like X-ray photoelectron spectroscopy and advanced simulations, the authors analyze charge transfer processes and electronic states to enhance the understanding of these materials for energy applications. Journal: *ScienceDirect Publication: Nano Energy*
- **Decoupling Chemical and Mechanical Contributions to Capacity Fading in Ni-Rich Cathodes for Sulfide-Based All-Solid-State Batteries** — score: 1.000 This study introduces a diagnostic framework to differentiate between the chemical and mechanical causes of capacity fading in Ni-rich cathodes of sulfide-based all-solid-state batteries (ASSBs). By analyzing charge and discharge fading, the research reveals that while (electro)chemical degradation primarily leads to charge fading through interfacial reactions, mechanical degradation dominates discharge fading due to particle cracking and delamination. The findings highlight the importance of optimizing both degradation aspects to enhance the durability of high-energy-density batteries. Journal: *Wiley: Advanced Energy Materials: Table of Contents*
- **Revealing key structures for reversible sulfur redox in amorphous polymeric sulfur** — score: 1.000 The study investigates the structural changes in amorphous sulfurized polyacrylonitrile used in Li–S batteries, discovering that S–C bond formation, – stacking, and shortening of sulfur chains play crucial roles in facilitating reversible sulfur redox reactions. These findings clarify the mechanisms that enhance cycle life by reducing polysulfide shuttling during battery operation. Journal: *Nature Materials*
- **Unleashing Sodium–Sulfur Battery Performance With Atomically Dispersed Single Atom Catalysts** — score: 1.000 The article explores how single atom catalysts (SACs) can enhance the performance of room temperature sodium-sulfur (Na–S) batteries by addressing issues such as slow redox kinetics and the shuttle effect of sodium polysulfide intermediates. By analyzing the relationship between the structural characteristics of SACs and their catalytic efficacy, the authors also highlight the role of theoretical density functional theory simulations in understanding the reaction mechanisms involved, while outlining ongoing challenges and future research directions. Journal: *Wiley: Advanced Energy Materials: Table of Contents*
- **Probing Battery Interfaces and Interphases with Microelectrodes: Spatially and Temporally Resolved Single-Entity Measurements** — score: 1.000 The article discusses the advantages of using microelectrodes to study battery interfaces and interphases with high spatial and temporal resolution. By directly probing individual electrochemical processes such as charge transfer and phase transitions, these tools provide insights that bridge localized phenomena and overall battery performance, paving the way for optimized designs in future energy storage systems. The review emphasizes the transformative potential of microelectrodes in understanding complex battery dynamics, particularly in non-equilibrium conditions. Journal: *Wiley: Advanced Energy Materials: Table of Contents*
- **Simultaneously Preventing Oxygen Evolution, Structure Degradation, and Thermal Release in Lithium-Rich Layered Oxides via In Situ Surface Anchoring Negative Thermal**

Expansion Material — score: 1.000 The article presents a novel approach for enhancing lithium-rich layered oxides (LROs) used in batteries by in situ anchoring a negative thermal expansion material, ZrW₂O₈, which effectively reduces oxygen evolution and structural degradation. This modification improves electrochemical performance, leading to significant gains in capacity retention and Li⁺ diffusion, while also decreasing thermal release and strain during cycling, demonstrating a comprehensive strategy for improving energy material stability and performance. Journal: *Wiley: Advanced Energy Materials: Table of Contents*

- **Resolving the Controversy of Zinc Pyrovanadate in Aqueous Zinc-Ion Batteries: Intrinsic Inertness, Formation Mechanism, and Characterization Pitfalls** — score: 1.000 This study clarifies the ongoing debate around zinc pyrovanadate (ZVO) in aqueous zinc-ion batteries by showing its intrinsic electrochemical inertness, attributed to impurities rather than inherent activity. It identifies critical experimental artifacts that have previously mischaracterized ZVO and elucidates a pH-dependent formation mechanism. These insights pave the way for improved designs in stable aqueous energy storage systems. Journal: *Wiley: Advanced Energy Materials: Table of Contents*
- **Origin of Optimal Composition and Density for Li-Ion Diffusion in Amorphous Li-P-S Electrolytes** — score: 1.000 This study employs AI-driven simulations to unravel the mechanisms behind lithium ion diffusion in amorphous Li₂S–P₂S₅ electrolytes, highlighting the crucial roles of Li–S₄ coordination and pore evolution in enhancing short-range transport. The findings indicate optimal conductivity near specific compositions and densities, while excessive free volume can inhibit diffusion, offering insights for designing efficient solid-state battery electrolytes. Journal: *Wiley: Advanced Energy Materials: Table of Contents*
- **A Stage-Wise Plateau-Sodiation Mechanism Enabled by Ultramicropores in the Hard Carbon Anode for Sodium Storage** — score: 1.000 This research presents a novel two-stage sodiation mechanism in hard carbon anodes for sodium-ion batteries, revealing distinct phases in the low-potential plateau sodiation process driven by ultramicropores. The findings link pore architecture to enhanced sodium storage, resulting in a high reversible capacity of 402.3 mAh g⁻¹, and offer vital insights for future advanced anode material design. Journal: *Wiley: Advanced Energy Materials: Table of Contents*
- **A Bismuth-Derived, Inorganic-Rich Artificial Solid Electrolyte Interphase Enables a Stable and Dendrite-Free Lithium-Metal Anode in Rechargeable Batteries** — score: 1.000 The study presents a bismuth-derived artificial solid electrolyte interphase (ASEI) that significantly enhances the stability and performance of lithium-metal anodes in rechargeable batteries. This ASEI, formed from a reaction between lithium and a bismuth salt, effectively prevents dendrite formation and supports uniform lithium plating and stripping, resulting in impressive battery longevity and cycling performance, including a 10-Ah pouch cell achieving over 460 Wh kg⁻¹ energy density. Journal: *Wiley: Advanced Energy Materials: Table of Contents*
- **Decoupling the Interfacial Failure Mechanisms of Zn Anodes via Functional Zoning Strategy** — score: 1.000 The article presents a groundbreaking functional zoning strategy for zinc anodes in aqueous zinc-ion batteries, utilizing a self-assembled interface made from [2-(9H-carbazol-9-yl)ethyl]phosphonic acid (2PACz). This approach effectively mitigates issues like dendrite growth, hydrogen evolution, and poor ion transport by compartmentalizing molecular functions, leading to enhanced stability and performance of the anodes, including over 4000 hours of operation at high current densities. Journal: *Wiley: Advanced Energy Materials: Table of Contents*
- **Regulating Ni 3d-O 2p Orbital Interaction with Position-Isomer Organic Lithiation Additive for High-Voltage LiNi_{0.8}Co_{0.1}Mn_{0.1}O₂ Cathode** — score: 1.000 The article discusses the innovative use of lithium 2-thiopheneboron (2LTB) as a slurry additive to enhance the performance of high-voltage LiNi_{0.8}Co_{0.1}Mn_{0.1}O₂ cathodes by minimizing nickel-oxygen orbital overlap, thereby stabilizing lattice oxygen and preventing structural degradation. This approach leads to improved cycling stability and performance, with notable capacity retention after extensive charge cycles, highlighting its potential for enhancing lithium-ion battery technology. Journal: *Wiley: Advanced Energy Materials: Table of Contents*

- **Quantifying Lattice–Crack–Electrochemical Transport Coupling for Durable, Fast-Charging Battery Cathodes** — score: 1.000 This research introduces a framework that quantitatively connects the effects of microstructural fractures, lithium ion transport, and charge transfer in battery cathodes. It demonstrates that while polycrystalline materials benefit from crack-generated active surfaces for fast charging, smaller single-crystal cathodes can deliver similar performance while maintaining durability, offering new design strategies for next-generation batteries. Journal: *Wiley: Advanced Energy Materials: Table of Contents*
- **High-Entropy Doping Strategy for Ultra-Stable Upcycling of Spent High-Nickel Cathodes** — score: 1.000 This study presents a high-entropy doping strategy that effectively stabilizes upcycled high-nickel cathodes (HE-NCM811), significantly reducing structural degradation during cycling. The approach leads to impressive electrochemical performance, with an ultra-low capacity decay rate of 0.032% per cycle over 1000 cycles, offering a sustainable solution for battery recycling while paving the way for innovative, high-performance cathode designs. Journal: *Wiley: Advanced Energy Materials: Table of Contents*
- **Alkyl Ammonium Halides Solubilizer-Mediated Interfacial Engineering Enables Reversible Divalent Metal Batteries** — score: 0.900 The study introduces alkyl ammonium iodides (RNH_3I) as solubilizers that enhance the dissolution of CaI_2 salts, leading to improved Ca^{2+} diffusion and formation of a hybrid electrolyte interface in calcium metal batteries. This advancement results in over 20-fold reduction in voltage overpotential during cycling, and the technique is also applicable to magnesium metal batteries, highlighting a new approach to optimizing divalent metal battery interfaces. Journal: *Wiley: Advanced Energy Materials: Table of Contents*
- **Tailoring Interfacial Reactions by Lactate-Mediated Gradient Ion Pump for Reversible Aqueous Zinc Metal Batteries** — score: 0.900 The article presents a novel approach to improve the electrochemical performance of aqueous zinc metal batteries (AZMBs) by utilizing lactate (LA) anions to create a gradient ion-pumping solid electrolyte interphase (GIP-SEI). This GIP-SEI enhances Zn plating/stripping reversibility, leading to remarkable coulombic efficiency and stability in battery cycles, ultimately providing new insights into electrolyte design principles for more durable aqueous battery systems. Journal: *Wiley: Advanced Energy Materials: Table of Contents*
- **In Situ Mechanistic Study of Plasmon-Governed Reaction Pathways in Li–O₂ Batteries With a Au@MOF Cathode** — score: 0.900 This study presents a novel light-driven Li–O₂ battery featuring gold nanoparticle-embedded UiO-66-NH₂ as a photocathode, enhancing overall efficiency by promoting selective lithium peroxide formation while minimizing side products. The battery demonstrated remarkable performance with a low recharge overpotential and sustained stability for over 600 hours under illumination, showcasing the effectiveness of plasmonic metal-organic frameworks in advancing energy storage technologies. Journal: *Wiley: Advanced Energy Materials: Table of Contents*
- **[ASAP] Identification of Lithiation Mechanisms in Li-Ion Batteries: Multilayer Electrodes and Neutron Reflectometry** — score: 0.900 The article investigates the lithiation mechanisms in lithium-ion batteries, focusing on multilayer electrodes. Utilizing neutron reflectometry, the study reveals insights into how lithium ions interact with electrode materials, improving the understanding of battery performance and longevity. Journal: *ACS Energy Letters: Latest Articles (ACS Publications)*
- **Discontinuous Coordination Boosting Ion Transport in Solid Polymer Electrolytes** — score: 0.800 The article explores the mechanism of improving ionic conductivity and transference number in solid polymer electrolytes by decoupling lithium ion transport from polymer segmental dynamics. It investigates four ether-based solid polymer electrolytes to identify strategies for enhancing their performance in energy applications. Journal: *RSC - Energy Environ. Sci. latest articles*
- **[ASAP] Gradient-Interlocked Solid Electrolyte Interphase via Spatial Reconfiguration for Stable Silicon Anodes in Solid-State Batteries** — score: 0.800 The article discusses the development of a gradient-interlocked solid electrolyte interphase (SEI) achieved through spatial reconfiguration, which enhances the stability of silicon anodes in solid-state batteries. This innovative approach aims to improve the performance and longevity of batteries by addressing the challenges

associated with silicon's expansion and contraction during cycling. Journal: *Journal of the American Chemical Society: Latest Articles (ACS Publications)*

- **Magnetoelectric coupling drives ultrafast-charging MoS anodes for sodium-ion batteries** — score: 0.800 The article discusses the development of Co-doped MoS anodes for sodium-ion batteries, focusing on how magnetoelectric coupling enhances the interfacial kinetics of Na⁺-storage. This advancement aims to address the challenges of ultrafast charging capabilities in these batteries, potentially improving their overall efficiency and performance. Journal: *RSC - Energy Environ. Sci. latest articles*
- **[ASAP] Heterohalogenated Hybrid SEI Reconstructs Graphite Anode Interfacial Kinetics at Low Temperatures** — score: 0.800 The article discusses the development of a heterohalogenated hybrid solid-electrolyte interphase (SEI) that significantly enhances the interfacial kinetics of graphite anodes in low-temperature conditions. This advancement aims to improve the performance and efficiency of batteries, especially in cold environments, by optimizing the chemical interactions at the anode's surface. Journal: *ACS Energy Letters: Latest Articles (ACS Publications)*
- **High-Entropy Materials as Anodes in Sodium-Ion Batteries: Current Status, Challenges, and Future Perspectives** — score: 0.800 This review provides a comprehensive analysis of high-entropy materials (HEMs) as anodes in sodium-ion batteries (SIBs), detailing various sodium storage mechanisms and categorizing HEMs into six types. It addresses the current challenges in synthesis and performance improvement, while suggesting future research directions aimed at enhancing their electrochemical properties and adaptability across different temperature ranges. Journal: *Wiley: Advanced Energy Materials: Table of Contents*
- **Comprehensive Guide for the Rational Design of High-Entropy Layered Transition Metal Oxide Cathodes for Sodium-Ion Batteries** — score: 0.800 This review provides an in-depth exploration of high-entropy doping techniques for layered transition metal oxide cathodes in sodium-ion batteries, aimed at improving performance amidst the challenges posed by sodium's larger ionic radius. By examining 135 studies, it discusses the advantages of compositional flexibility and the need for careful selection of dopants to optimize battery characteristics, while also clarifying the complexities and defining issues related to "high entropy" materials. Ultimately, the review offers guidance for future research in this rapidly evolving field. Journal: *Wiley: Advanced Energy Materials: Table of Contents*
- **A Multifunctional Conductive Binder Network Stabilizing Black Phosphorus Anodes for Long-Cycle-Life Lithium-Ion Batteries** — score: 0.800 The study introduces a novel 3D conductive polymer binder (CP-Si) that enhances the stability and performance of black phosphorus anodes in lithium-ion batteries. By addressing key issues like volume expansion and lithium polyphosphide dissolution, the CP-Si binder helps achieve impressive cycling stability and maintains a high capacity (741.0 mAh g⁻¹) after 3000 cycles, thereby contributing to the advancement of high-performance energy storage technologies. Journal: *Wiley: Advanced Energy Materials: Table of Contents*
- **Programmable Steric-Enhanced Dual-Crosslinking Preoxidation Unlocks Closed-Pore Dominated Sodium Storage in Pitch-Derived Carbon Anodes** — score: 0.800 The article introduces a novel Steric-Enhanced Dual-Crosslinking (SEDC) preoxidation strategy for modifying the microstructure of pitch-derived carbon anodes in sodium-ion batteries. By incorporating multifunctional organophosphorus compounds, the method enhances crosslinking and creates a disordered carbon structure with abundant closed nanopores, achieving a remarkable sodium storage capacity of 378.4 mAh g⁻¹ and 90% initial Coulombic efficiency, providing a scalable approach for high-performance anode development. Journal: *Wiley: Advanced Energy Materials: Table of Contents*
- **Critical Role of Li⁺ · · · Li⁺ Distance and Anion Restriction in Conductivity and Lithium-Ion Transference Number of Molecular Crystals for Solid State Electrolytes** — score: 0.800 The article explores the relationship between the Li⁺ · · · Li⁺ distance and anion mobility in a series of molecular crystals containing (dinitrile)2LiPF₆, revealing that shorter Li⁺ hopping distances enhance ionic conductivity and lithium-ion transference numbers. However, in cases where anion migration is restricted, the overall conductivity decreases while the transference number for

lithium ions increases, highlighting a complex trade-off between anion dynamics and ionic transport efficiency. Journal: *Wiley: Advanced Energy Materials: Table of Contents*

- **Unveiling Dominant Processes of Na Cluster Formation and Na-Ion Diffusion in Hard Carbon Nano-Pore: A DFT-MD Study** — score: 0.800 This study employs density-functional-theory-based molecular dynamics to investigate sodium (Na) cluster formation and diffusion in hard carbon anodes for sodium-ion batteries. Findings reveal that Na clusters preferentially form at pore centers and that the optimal pore size for clustering is around 1.5 nm. Although Na ions show high diffusivity in certain regions, the transition between varying interlayer distances is identified as a significant barrier to ion mobility. Journal: *Wiley: Advanced Energy Materials: Table of Contents*
- **Solvation-configurational entropy governs interfacial kinetics in low-temperature batteries** — score: 0.800 This article explores how solvation-configurational entropy influences ion desolvation processes in low-temperature batteries. By highlighting that higher entropy in electrolytes facilitates faster desolvation and enhances charge transfer, the study suggests that increasing entropic diversity can improve battery performance and stability in challenging environments. Journal: *Joule*
- **Magnetic field sensing of inhomogeneous degradation in Lithium-ion batteries with spatio-temporal evolution** — score: 0.800 The article discusses a novel approach to monitor the degradation of Lithium-ion batteries by utilizing magnetic field sensing techniques, which can detect inhomogeneous changes over time and space. This method enhances the understanding of battery stability and health, critical for improving energy storage technologies. Journal: *ScienceDirect Publication: Energy Storage Materials*
- **A Molecularly Engineered Crosslinked Polyether Electrolyte with Anion-Trapping Nano-Networks for Fast-Charging and Safe Sodium Metal Batteries** — score: 0.800 The study introduces a novel anion-anchoring crosslinked polyether electrolyte designed for solid-state sodium metal batteries (SMBs), which uses epoxy-functionalized halloysite nanotubes to enhance ionic conductivity and thermal stability. This engineered electrolyte demonstrates a high Na⁺ transference number and robust interfaces, enabling fast-charging capabilities and improved safety, as evidenced by excellent performance in symmetric cells and practical pouch cells. Journal: *Wiley: Advanced Energy Materials: Table of Contents*
- **Halogen-Induced Anion-Rich Solvation Structure Enables High Li⁺ Transference Number of Gel Polymer Electrolyte for Durable Lithium Metal Batteries** — score: 0.800 The article discusses the development of a gel polymer electrolyte (GPE) featuring a polyethylenimine-iodine (PEI-I) additive aimed at enhancing the performance of lithium metal batteries. By modifying the lithium ion solvation structure, the GPE achieves a high Li⁺ transference number of 0.88, significant ionic conductivity, and stable cycling performance, thus overcoming challenges associated with the solid electrolyte interphase and improving battery durability. Journal: *Wiley: Advanced Energy Materials: Table of Contents*
- **[ASAP] Defect Electrochemistry in Stabilizing Corrugated Layered NaMnO₂** — score: 0.800 The article explores the electrochemical behavior of defects in layered NaMnO₂, focusing on how these defects contribute to the stabilization of the material's corrugated structure. The findings are significant for advancing the understanding of sodium-ion battery materials, particularly in optimizing their performance and longevity. Journal: *Journal of the American Chemical Society: Latest Articles (ACS Publications)*
- **[ASAP] Mechanistic Insights into Sodium Plating in Hard Carbon Anodes: Electrolyte Design Principles for Practical Medium Voltage Sodium-Ion Full Batteries** — score: 0.800 The article investigates the mechanisms of sodium plating in hard carbon anodes for sodium-ion batteries, focusing on the design principles of electrolytes that can enhance the performance and feasibility of medium voltage sodium-ion full batteries. By understanding these mechanisms, the research aims to contribute to the development of more efficient and practical energy storage solutions. Journal: *ACS Energy Letters: Latest Articles (ACS Publications)*
- **Comparative Insights and Overlooked Factors of Interphase Chemistry in Alkali**

Metal-Ion Batteries — score: 0.800 This review examines the interphase chemistry of Li-, Na-, and K-ion batteries, emphasizing how the electrode-electrolyte interphases significantly impact battery performance and stability. It explores commonly misunderstood aspects of interphase dynamics, the influence of binders, and the implications for self-discharge, advocating for a refined understanding and optimization strategies for these critical components in alkali metal-ion batteries. Journal: *Wiley: Advanced Energy Materials: Table of Contents*

- **An Ion–Dipole Interaction Regulation of Desolvation Kinetics and Interfacial Stability for Stable and Fast-Charging Sodium-Ion Batteries** — score: 0.800 The article examines how ion-dipole interactions can influence desolvation kinetics and enhance interfacial stability, which are crucial for the performance of sodium-ion batteries, particularly in achieving rapid charging capabilities. The authors propose mechanisms to optimize these interactions to improve battery efficiency and longevity. Journal: *ScienceDirect Publication: Energy Storage Materials*
- **[ASAP] Microscopic Mechanisms of Superionic Na-ion Conductivity in Crystalline and Amorphous NaMOC₁₄ (M = Nb, Ta) Solid Electrolytes** — score: 0.800 The article investigates the microscopic mechanisms underlying superionic sodium-ion conductivity in both crystalline and amorphous forms of NaMOC₁₄ solid electrolytes, where M refers to either niobium (Nb) or tantalum (Ta). Through this study, the authors aim to enhance the understanding of ionic transport in these materials, which is crucial for the development of efficient sodium-ion batteries. Journal: *ACS Energy Letters: Latest Articles (ACS Publications)*
- **Vacancy-Induced Li⁺ Conduction of Li_{3-x}Al_{1-x}Ti_xF₆ Fluoride Solid Electrolyte for 5 V All-Solid-State Batteries** — score: 0.700 The study investigates the conduction mechanisms of lithium ions in the fluoride solid electrolyte Li_{3-x}Al_{1-x}Ti_xF₆, focusing on how vacancies influence ionic transport properties. This research aims to enhance the performance of 5 V all-solid-state batteries by optimizing the ionic conductivity through vacancy-induced effects. Journal: *ScienceDirect Publication: Energy Storage Materials*
- **High-valence Mo doping enables phase-stable, fast-transport Na₃V₂(PO₄)₃ cathodes for high-performance sodium-ion batteries** — score: 0.600 This article discusses the successful doping of sodium-ion battery cathodes with high-valence Molybdenum (Mo), which enhances the material's phase stability and ionic conductivity. The findings suggest that these improved Na₃V₂(PO₄)₃ cathodes may significantly boost the performance and efficiency of sodium-ion batteries. Journal: *ScienceDirect Publication: Nano Energy*
- **Hydroxide/Selenide Heterostructures With Built-In Electric Fields Enabling Reconstruction for Advanced Quasi-Solid-State Supercapacitors** — score: 0.600 The study explores the development of hydroxide/selenide heterostructures, specifically NiCoSe@Ni(OH)₂, which enhance electrochemical activation for hybrid supercapacitors. By analyzing built-in electric fields and charge redistribution, the researchers demonstrate that these structures facilitate significant improvements in areal capacitance, cycling stability, and rate performance, even as their interfaces undergo transformations during operation. Journal: *Wiley: Advanced Energy Materials: Table of Contents*
- **A Stable and Reliable Li-In Alloy Counter Electrode for Sulfide-Based All-Solid-State Batteries** — score: 0.600 The article presents a novel approach for creating a homogeneous Li-In alloy counter electrode using a chemical pre-lithiation technique, which addresses the inefficiencies of conventional cold-pressed Li-In electrodes. This new PL-LiIn/In electrode demonstrates enhanced reaction kinetics and high lithium-extraction capacity, enabling effective performance evaluation of initially lithium-free electrodes in sulfide-based all-solid-state batteries. Journal: *Wiley: Advanced Energy Materials: Table of Contents*
- **[ASAP] Substitution-Mediated Calcination of Nickel-Based Cathodes: Decoupling Lithiation and Crystallization** — score: 0.600 The article discusses a novel approach for enhancing nickel-based cathodes by employing substitution-mediated calcination, which effectively separates the processes of lithiation and crystallization. This method aims to improve the performance of the cathodes in energy storage applications, potentially leading to more efficient batteries. Journal: *Journal*

of the American Chemical Society: Latest Articles (ACS Publications)

- **Lattice Distortion Driven Spin-State Engineering in Fe-Based Electrodes for High-Performance Reversible Proton-Conducting Solid Oxide Cells** — score: 0.600 The study presents a method to enhance the performance of Fe-based electrodes for reversible proton-conducting solid oxide cells by incorporating Zn²⁺ into SmBaFe₂O₅⁺, which induces lattice distortion and leads to a favorable transition of Fe³⁺ ions from high-spin to low-spin states. This modulation improves oxygen electrocatalysis by strengthening Fe–O bonds and promoting oxygen-vacancy ordering, resulting in a significant increase in power density and current capabilities, along with confirming durability, thus offering a scalable solution for advanced energy applications. Journal: *Wiley: Advanced Energy Materials: Table of Contents*
- **From Promise to Production: Strategy for Halide-Based All-Solid-State Battery Pilot Lines** — score: 0.600 The article outlines a strategic approach for the development of halide-based all-solid-state battery (ASSB) pilot lines, emphasizing their advantages such as high ionic conductivity, electrochemical stability, and ease of manufacturing. It proposes a unified framework integrating fundamental research with engineering practices to facilitate the transition from laboratory to industrial applications, while also introducing a novel evaluation system to optimize application scenarios. By addressing key challenges, halide solid-state electrolytes are positioned as a leading solution for the commercialization of ASSBs, particularly for electric vehicles and grid storage. Journal: *Wiley: Advanced Energy Materials: Table of Contents*
- **Full-cycle oxygen-tolerant organic flow batteries** — score: 0.600 The article introduces a novel design for an aqueous organic redox flow battery (AORFB) that is resistant to oxygen, utilizing a foldamer-dimer structure. This design allows for a viologen negolyte that maintains its performance regardless of concentration, resulting in enhanced coulombic efficiency and exceptional cycling stability when exposed to air. Journal: *Joule*
- **[ASAP] Understanding the Role of Triple Phase Boundaries on Coating-Free Solid-State Cathodes** — score: 0.600 The article explores how triple phase boundaries influence the performance of coating-free solid-state cathodes in energy storage systems. It examines the relationship between these boundaries and the overall efficiency of the cathodes, providing insights that may enhance the design of next-generation energy devices. Journal: *ACS Energy Letters: Latest Articles (ACS Publications)*
- **Work of adhesion guided nucleation control for energy-dense potassium metal batteries** — score: 0.500 The article explores the significance of work of adhesion in the nucleation process of potassium metal batteries, highlighting its role in preventing dendrite formation by ensuring uniform nucleation. By selecting appropriate substrate materials and engineering their nanoscale roughness, the study demonstrates how to enhance the stability of potassium deposition, ultimately leading to more durable batteries. This research presents a valuable design principle for improving energy-dense metal batteries. Journal: *Joule*
- **Orbital Engineering Activated Intrinsic Conduction Enables Ultra-high-rate Performance Zinc Storage in Manganese Dioxide** — score: 0.500 The article discusses advancements in the performance of manganese dioxide (-MnO₂) as a cathode material for aqueous zinc-ion batteries (AZIBs) through orbital engineering to enhance intrinsic conductivity. This improvement addresses the limitations of poor conductivity in layered manganese oxides, thereby facilitating ultra-high-rate zinc storage and making these materials more viable for energy applications. Journal: *RSC - Energy Environ. Sci. latest articles*
- **Zinc oxides reinforced silicon anodes for high-performance all-solid-state lithium-ion batteries** — score: 0.400 The article discusses the development of zinc oxide-reinforced silicon anodes aimed at improving the performance of all-solid-state lithium-ion batteries (ASSLBs). It highlights silicon's high theoretical capacity and abundance as key advantages for use in battery technology, proposing enhancements through the incorporation of zinc oxides to optimize efficiency and longevity in energy storage systems. Journal: *RSC - EES Batteries latest articles*