How do electrochemical interface properties affect energy conversion and storage systems?Because both charge transfer and various types of chemical interactions are driven between the electrified electrode and electrolyte, the properties of the electrochemical interface determine the efficiency of electrochemical energy conversion and storage systems. What are electrochemical interfaces?Electrochemical interfaces are complex reaction fields of mass transport and charge transfer. They are the centerpiece of energy storage and conversion devices -- such as batteries, supercapacitors, fuel cells, solar cells, or electrolyzers -- as well as electrochemical syntheses. What is electrochemical energy conversion & storage?This publication is licensed under CC-BY-NC-ND 4.0. Electrochemical energy conversion and storage are central to developing future renewable energy systems. For efficient energy utilization, both the performance and stability of electrochemical systems should be optimized in terms of the electrochemical interface. Why do we need to understand the dynamics within an electrochemical interface?From this perspective, we highlight the importance of understanding the dynamics within an electrochemical interface in the process of designing highly functional and robust energy conversion and storage systems. What are electrochemical storage systems?Electrochemical storage systems, encompassing technologies from lithium-ion batteries and flow batteries to emerging sodium-based systems, have demonstrated promising capabilities in addressing these integration challenges through their versatility and rapid response characteristics. Why are advanced electrochemical energy storage systems becoming more popular?As a result, there is an increasing demand for advanced electrochemical energy storage systems that exceed the performance limits of conventional lithium-ion batteries (LIBs). The energy density of traditional LIB configurations, featuring LiCoO 2 or LiFePO 4 cathodes paired with graphite anodes, has reached its theoretical limit. Dynamic Electrochemical Interfaces for Energy From this perspective, we highlight the importance of understanding the dynamics within an electrochemical interface in the process of designing highly functional and robust energy conversion and storage systems. AI driven electrochemical interface design: development and The electrochemical interface, serving as the physical boundary where electrode materials and electrolytes engage in energy conversion and information transfer, is the central Covalently Interlocked Electrode-Electrolyte As a result, there is an increasing demand for advanced electrochemical energy storage systems that exceed the performance limits of conventional lithium-ion batteries (LIBs). Electrochemical interfaces They are the centerpiece of energy storage and conversion devices -- such as batteries, supercapacitors, fuel cells, solar cells, or electrolyzers -- as well as electrochemical syntheses. Surface and Interface Engineering for Electrochemical Energy Surface and Interface Engineering for Electrochemical Energy Storage and Conversion [J]. Acta Phys. -Chim. Sin. , 38 (6), 2109020. doi: 10./PKU.WHXB202109020 Advancing Electrochemical Energy Storage: He earned his PhD from Peking University in and had been serving at NUST since then. His primary research focuses on the development of advanced electrode materials for energy storage and conversion Frontiers | Editorial: Interface and structure designs of electrode

Therefore, it is possible to improve the energy storage performance, reliability, and safety by investigating the interface and structure. This Research Topic aims to highlight Flexible electrochemical energy storage devices This review is intended to provide strategies for the design of components in flexible energy storage devices (electrode materials, gel electrolytes, and separators) with the aim of developing energy storage Electrochemical storage systems for renewable energy This comprehensive review systematically analyzes recent developments in electrochemical storage systems for renewable energy integration, with particular emphasis on Advanced architectures of electrochemical interfaces"The interface is the device" was coined by Nobel laureate Herbert Kroemer. Electrochemistry is the science of interfaces, and interface issues are prevalent in various Hierarchical NiCo-LDH core/shell homostructural electrodes with This work demonstrates a new strategy for designing hierarchical LDH with core/shell structure as electrode materials for superior electrochemical energy storage. Zwitterionic materials in electrochemical energy storageZwitterionic materials have gained increased attention in electrochemical energy storage field for their particular structure containing both electronegative group and Highly deformable bi-continuous conducting polymer hydrogels for Conducting polymer hydrogels with inherent flexibility, ionic conductivity and environment friendliness are promising materials in the fields of energy storage. However, a Unlocking high-entropy electrolyte solutions for next-generation Challenges and perspectives in high-entropy electrolyte technologies are discussed. High-entropy electrolyte solutions (HEESs) are emerging as a transformative Synergistic effect of Co/Ni bimetallic metal-organic Synergistic effect of Co/Ni bimetallic metal-organic nanostructures for enhanced electrochemical energy storage Xinxin Hang , Jiawei Zhao , Yadan Xue , Rui Yang , Intercalation chemistry engineering strategy enabled high mass Aqueous electrochemical energy storage devices (AEESDs) are considered one of the most promising candidates for large-scale energy storage infrastructure due to their high Development and forecasting of electrochemical energy storage: Abstract In this study, the cost and installed capacity of China's electrochemical energy storage were analyzed using the single-factor experience curve, and the economy of Infrared nanoimaging and nanospectroscopy of electrochemical energy Electrochemical interfaces are central to the function and performance of energy storage devices. Thus, the development of new methods to characterize these interfaces, in Fundamental electrochemical energy storage mechanismsTherefore, the electrochemical reaction mechanism of the battery must be clearly known so as to obtain excellent electrochemical performance for energy storage and Introduction to electrochemical energy storage technologiesEnergy conversion and storage technologies based on sustainable energy sources have attracted a great deal of interest owing to the continuously rising demand for Electrochemical Energy Storage Electrochemical energy storage is defined as a technology that converts electric energy and chemical energy into stored energy, releasing it through chemical reactions, primarily using Surface and Interface Engineering for Electrochemical Energy Storage Special Issue Information Electrochemical technologies for energy storage and conversion, such as batteries,

capacitors and electrocatalysis, are sensitive to the physico-chemical properties of Probing Interfacial Nanostructures of Electrochemical Energy Storage The ability to control the electrode interfaces in an electrochemical energy storage system is essential for achieving the desired electrochemical performance. However, Introduction to electrochemical energy storage technologiesEnergy conversion and storage technologies based on sustainable energy sources have attracted a great deal of interest owing to the continuously rising demand for Probing Interfacial Nanostructures of Electrochemical Energy Storage The ability to control the electrode interfaces in an electrochemical energy storage system is essential for achieving the desired electrochemical performance. However, Surface and Interface Engineering for Electrochemical Energy Storage Surface and Interface Engineering for Electrochemical Energy Storage and Conversion [J]. Acta Phys. -Chim. Sin. , 38 (6), 2109020. doi: 10./PKU.WHXB202109020 Bi-functional Mo-doped WO3 nanowire array In addition, as a proof of concept, the Mo-doped WO 3 nanowire arrays are demonstrated with electrochemical energy storage monitored by the electrochromism. This Interface microenvironment regulation of pitch/PAN-derived In the electrochemical energy storage process, the hydrophilicity of electrode materials also determines whether water and ions can tightly adsorb on their rich interface Numerical and experimental study of electrochemical energy storage Numerical and experimental study of electrochemical energy storage and load-bearing towards forward design of structural supercapacitors Journal of Colloid and Interface Science (IF 9.4) Energy and fuels from electrochemical interfaces Advances in electrocatalysis at interfaces are vital for driving technological innovations related to energy. New materials developments for efficient hydrogen and oxygen Ferroelectrics enhanced electrochemical energy storage systemThe ever-increasing consumption of energy has driven the fast development of renewable energy technologies to reduce air pollution and the emission of greenhouse gas. Surface and interface engineering: Graphene-based freestanding Abstract Next-generation energy storage methods are closely related to green recovery in the post-pandemic period and the future energy structure. Advanced graphene Leveraging electrochemical double layer structure to rationally The interface created when contacting an electrode with an electrolyte is remarkably diverse, characterized by uneven distributions of charge density and the Numerical and experimental study of electrochemical energy storage The energy storage region consists of a porous activated carbon (AC)-modified CF electrode and PEO-based gel polymer electrolyte for high energy density, whereas the load Dynamic Electrochemical Interfaces for Energy Conversion and StorageAbstract Electrochemical energy conversion and storage are central to developing future renewable energy systems. For efficient energy utilization, both the performance and stability Hierarchical NiCo-LDH core/shell homostructural electrodes with This work demonstrates a new strategy for designing hierarchical LDH with core/shell structure as electrode materials for superior electrochemical energy storage.