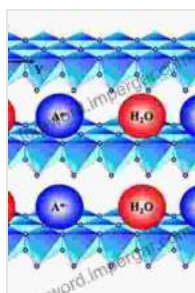


Progress In Layered Double Hydroxides: A Comprehensive Guide for Researchers and Industry Professionals

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Layered Double Hydroxides (LDHs) have emerged as a promising class of materials with exceptional versatility and potential applications in various fields. This book presents a comprehensive overview of the latest advancements in LDH research, providing researchers and industry professionals with an in-depth understanding of their synthesis, characterization, surface modification, and applications.



Progress In Layered Double Hydroxides: From Synthesis To New Applications (Series On Chemistry, Energy And The Environment Book 8) by Elizabeth Abbott

★★★★☆ 4.5 out of 5

Language : English
File size : 19633 KB
Text-to-Speech : Enabled
Enhanced typesetting : Enabled
Print length : 521 pages
Screen Reader : Supported



Chapter 1: Synthesis and Characterization of Layered Double Hydroxides

This chapter covers the fundamental principles and techniques involved in LDH synthesis. It discusses various methods for controlling the

composition, morphology, and crystal structure of LDHs. Advanced characterization techniques, such as X-ray diffraction, scanning electron microscopy, and transmission electron microscopy, are also explored to analyze the structural, morphological, and compositional properties of LDHs.

Chapter 2: Surface Modification of Layered Double Hydroxides

Surface modification plays a crucial role in tailoring the properties of LDHs for specific applications. This chapter explores different methods for modifying LDH surfaces, including ion exchange, acid etching, organic functionalization, and metal-organic frameworks synthesis. The impact of surface modification on the physicochemical properties, such as surface charge, porosity, and reactivity, is also discussed.

Chapter 3: Layered Double Hydroxides in Catalysis

LDHs have demonstrated promising potential as catalysts for a wide range of chemical reactions. This chapter reviews the use of LDHs in heterogeneous catalysis, focusing on their role in acid-base reactions, redox reactions, and photocatalysis. The effects of LDH composition, morphology, and surface modification on their catalytic performance are also explored.

Chapter 4: Layered Double Hydroxides in Energy Storage

LDHs are considered promising electrode materials for energy storage devices, such as batteries and supercapacitors. This chapter discusses the use of LDHs as anode and cathode materials, highlighting their high specific capacitance, rate capability, and long-term stability. The

mechanisms of charge storage and the relationship between LDH properties and energy storage performance are also examined.

Chapter 5: Layered Double Hydroxides in Environmental Remediation

LDHs possess excellent adsorption and ion exchange capabilities, making them suitable for environmental remediation applications. This chapter reviews the use of LDHs in the removal of heavy metals, organic pollutants, and anions from contaminated water and soil. The mechanisms of pollutant adsorption and the factors affecting the remediation efficiency are also discussed.

Chapter 6: Other Applications of Layered Double Hydroxides

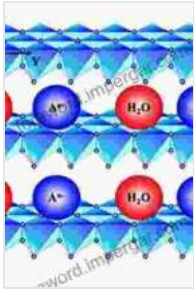
Beyond the aforementioned applications, LDHs have also shown promise in various other fields, including flame retardancy, drug delivery, sensors, and biomedicine. This chapter provides an overview of these emerging applications, showcasing the versatility and potential of LDHs.

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This book provides a comprehensive and up-to-date overview of the progress in Layered Double Hydroxides. It covers the fundamental principles, synthesis, characterization, surface modification, and applications of LDHs, making it an invaluable resource for researchers and industry professionals seeking to harness the power of these advanced materials for various technological advancements.

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