



# **FUNCTIONAL MATERIALS AND MATERIALS FOR ENERGY STORAGE AND ENERGY CONVERSION DEVICES**

**EDITED BY  
PROF. ALEXANDER M. KORSUNSKY  
PROF. DR. JAV DAVAASAMBUU  
PROF. DR. YURII OTROSH**

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Special topic volume with invited peer-reviewed papers only

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**Prof. Alexander M. Korsunsky,  
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# Preface

The rapid development of modern production is accompanied by an increasing demand for advanced materials that can meet the challenges of sustainability, energy efficiency, and environmental preservation. This special edition delves into critical areas where material science plays a pivotal role in addressing these global issues.

The first chapter explores the innovative materials that are transforming the energy sector, from enhancing battery performance to advancing solar cell technologies. It highlights cutting-edge research that pushes the boundaries of efficiency, storage capacity, and longevity in energy storage and energy conversion devices.

The next chapter covers the wide array of materials designed for specific applications, emphasizing their role in modern technologies and how their unique properties contribute to breakthroughs in fields such as electronics, biotechnology, etc.

The last third chapter addresses one of the most pressing and global concerns — water scarcity and its contamination. This section investigates the development of materials and technologies designed to purify, conserve, and manage water resources more effectively.

Together, these articles provide a comprehensive overview of how material innovations are driving technological progress in key areas critical to a sustainable future. We hope that this edition will serve as both a resource and inspiration for researchers, engineers, and students striving to push the frontiers of material science for the betterment of society.

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## **CHAPTER 1:**

# **Materials for Energy Storage and Energy Conversion Devices**