IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 7.53
Volume 4, Issue 8, May 2024

Remediation and Renewable Energy Storage

Ganesh B. Akat[1] and Balwan U. Patil[2]
Department of Chemistry, Kohinoor Arts, Commerce & Science College, Khultabad, Chhatrapati Sambhajinagar[1]
Department of Physics, Kohinoor Arts, Commerce & Science College, Khultabad, Chhatrapati Sambhajinagar[2]
ganeshbakat@gmail.com

Abstract: *Electrochemical technologies offer versatile solutions for pollution remediation and renewable energy storage, addressing critical environmental and energy challenges. In this chapter, we explore the principles, applications, recent advancements, and challenges of electrochemical technologies in these domains. Electrochemical pollution remediation utilizes redox reactions driven by electrical energy to degrade pollutants in water, soil, and air. Various techniques such as electrooxidation, electrocoagulation, and electrochemical advanced oxidation processes (EAOPs) are employed, offering selective pollutant removal and minimal chemical consumption. Electrochemical renewable energy storage encompasses batteries and supercapacitors, leveraging redox reactions and double-layer capacitance to store and release electrical energy efficiently. Lithium-ion batteries (LIBs) dominate portable electronics, electric vehicles, and grid-scale storage, while supercapacitors provide high-power buffering and extend battery lifespan in hybrid systems. Recent advancements include the development of novel electrode materials, optimization of reactor designs, and integration with renewable energy sources for sustainable operation. However, challenges such as electrode fouling, energy consumption, and resource availability persist, highlighting the need for continued research and innovation. By elucidating the principles and applications of electrochemical technologies, this chapter aims to contribute to the advancement of sustainable solutions for pollution remediation and renewable energy storage.*

Keywords: Electrochemical technologies, pollution remediation, renewable energy storage, electrooxidation, lithium-ion batteries

ISSN 2581-9429 IJARSCT