

Conclusion

Liquid-acid batteries, with their established technology and favorable characteristics, continue to play a significant role in energy storage applications. Their low cost, high energy density and reliability make them well suited for various uses, particularly in automotive, backup power, and renewable energy systems. However, their limitations, such as weight and maintenance requirements, should be considered when evaluating their suitability for specific applications. As battery technology continues to evolve, liquid-acid batteries will likely coexist with newer technologies, each finding their niche in powering our increasingly electrified world.

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SMALL NUCLEAR REACTORS: PAVING THE WAY FOR SIGNIFICANT ADVANCEMENTS IN NUCLEAR ENERGY

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Abstract: Nuclear energy has long been recognized as a reliable and low-carbon source of electricity generation. In recent years, significant advancements in nuclear technology have led to the emergence of small nuclear reactors (SNRs) as a promising solution for meeting our energy needs. This article explores the potential of SNRs to revolutionize the nuclear energy landscape, discussing their benefits, challenges, and the key role they can play in our transition to a sustainable future.

Key words: SNRs, Nuclear energy, large-scale nuclear power.

Introduction

Nuclear energy has long been recognized as a reliable and low-carbon source of electricity generation. In recent years, significant advancements in nuclear technology have led to the emergence of small nuclear reactors (SNRs) as a promising solution for meeting our energy needs. This article explores the potential of SNRs to revolutionize the nuclear energy landscape, discussing their benefits, challenges, and the key role they can play in our transition to a sustainable future. Traditional large-scale nuclear power plants have dominated the nuclear energy sector for decades. However, SNRs represent a departure from this conventional approach. Characterized by their smaller size, modular design, and enhanced safety features, SNRs offer numerous advantages over their larger counterparts. Advancements in SNR technology have led to improved thermal efficiencies and fuel utilization rates. These reactors can operate at higher temperatures, enabling more efficient conversion of heat into electricity. Additionally, some SNRs employ advanced fuel designs, such as high-temperature gas-cooled reactors and molten salt reactors, which have the potential to reduce nuclear waste and extend fuel cycle lifetimes, contributing to a more sustainable nuclear energy sector. SNRs offer a wide range of applications beyond traditional electricity generation, including district heating, desalination, and hydrogen production. Their compact size and versatility make them suitable for various industries and settings. Looking ahead, the ongoing research and development efforts, coupled with supportive policies and collaborative international cooperation, hold the key to unlocking the full potential of SNRs and driving significant advancements in nuclear energy. In the following sections, we will delve deeper into the benefits, challenges, and potential applications of SNRs, exploring how these small reactors can pave the way for significant advancements in nuclear energy and contribute to a sustainable future [1].

Results and discussion

Small nuclear reactors (SNRs) deviate from conventional large-scale nuclear power plants due to their smaller size, modular design, and enhanced safety features. These reactors typically

exhibit electrical outputs ranging from a few megawatts (MW) to a few hundred megawatts, rendering them suitable for diverse applications such as remote communities, industrial processes, and power supply for ships and submarines.

SNRs possess notable safety advantages, integrating passive safety systems like natural circulation and inherent shutdown mechanisms, which minimize the risk of accidents and mitigate their consequences in the event of failure. Moreover, the compact size of SNRs facilitates more manageable emergency response measures, ensuring elevated levels of safety and security.

The modular nature of SNRs allows for flexibility and scalability in energy production. Multiple small reactors can be deployed incrementally to match the energy demands of specific regions or facilities. This modular approach streamlines maintenance and upgrades, minimizing downtime and optimizing overall system efficiency. SNRs exhibit rapid deployment potential, making them suitable for both large-scale and distributed energy generation.

Advancements in SNR technology have led to improved thermal efficiencies and enhanced utilization rates of fuel. Operating at higher temperatures, these reactors enable more efficient conversion of heat into electricity. Additionally, advanced fuel designs, such as high-temperature gas-cooled reactors and molten salt reactors, can be employed in some SNRs, potentially reducing nuclear waste and extending fuel cycle lifetimes, thereby contributing to a more sustainable nuclear energy sector.

Despite their promise, SNRs face challenges that require attention. Regulatory frameworks need adaptation to accommodate SNR deployment while ensuring safety standards. Addressing the costs associated with SNR research, development, and licensing is crucial for their economic viability. Additionally, public perception and acceptance of nuclear energy, including SNRs, significantly influence their widespread adoption.

SNRs offer a broad range of applications beyond traditional electricity generation, including district heating, desalination, and hydrogen production. Their compact size and versatility make them suitable for various industries and settings. Looking ahead-continued research and development efforts, supported by favorable policies and international cooperation, hold the key to unlocking the full potential of SNRs and driving significant advancements in nuclear energy.

Conclusion

Small nuclear reactors have emerged as a promising solution to meet our increasing energy demands while addressing safety, efficiency, and waste reduction concerns. With their enhanced safety features, flexibility, and scalability, SNRs have the potential to revolutionize the nuclear energy landscape. However, overcoming regulatory, economic, and public acceptance challenges is essential for their successful deployment. As we strive for a sustainable future, SNRs can play a vital role in diversifying our energy mix and reducing greenhouse gas emissions, paving the way for a cleaner and more secure energy future.

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ENHANCEMENT OF PHOTOCATALYTIC ACTIVITIES TOWARD CHEMICAL AND ELECTROCHEMICAL REACTIONS IN AU NANOSTRUCTURES [MINI REVIEW]

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Abstract: This mini report provides an overview of the recent advancements in enhancing the photocatalytic activities of gold (Au) nanostructures for chemical and electrochemical reactions. Au nanostructures have gained significant attention as promising photocatalysts due to their unique