

Are spintronic devices energy efficient?

The current surge in data generation necessitates devices that can store and analyze data in an energy efficient way. This Review summarizes and discusses developments on the use of spintronic devices for energy-efficient data storage and logic applications, and energy harvesting based on spin.

What is the future of spintronic devices?

Corresponding device applications are discussed based on their recent development. Future perspectives on the spintronic devices are provided at the end of this review. Spintronics is one of the emerging fields for the next-generation nanoelectronic devices to reduce their power consumption and to increase their memory and processing capabilities.

Can spin information be used for energy harvesting?

In terms of energy harvesting with spin information, perhaps the most revolutionary concept in the last years has been the advent of the spin Seebeck effect and anomalous Nernst effect with already on-going commercial thermoelectric device developments.

Why are spintronic devices so popular?

Though the concept of electron spin was realized in the 1920s only, challenges in fabrication technology have hindered the development of spintronic devices and circuits. Spintronic devices hold supremacy in terms of their non-volatility, scalability, ease to read and write, and high endurance over the CMOS devices.

What is spintronic technology?

Spintronic is a whole new paradigm where the spin of an electron is exploited along with its charge. Though the concept of electron spin was realized in the 1920s only, challenges in fabrication technology have hindered the development of spintronic devices and circuits.

Can spintronics help beyond MRAMS?

Finally, a brief discussion is also presented about the emerging spintronics devices such as DW, ASL devices, skyrmions, and hybrid magnetic/silicon devices, which might help beyond the present-day commercial MRAMs.

In the past few decades, electricity production depended on fossil fuels due to their reliability and efficiency [1]. Fossil fuels have many effects on the environment and directly ...

An overview of the current status of research and technology developments in data storage and spin-mediated energy harvesting in relation to energy-efficient technologies ...

Modern railroad and subway trains also make widespread use of regenerative, flywheel brakes, which can give

a total energy saving of perhaps a third or more. Some electric car makers have proposed using super-fast ...

Hydrogen fuel is highly valued as ideal clean energy to solve the environmental crisis. Electrocatalytic water splitting, as the most promising hydrogen production method, has been ...

New materials hold the key to fundamental advances in energy conversion and storage, both of which are vital in order to meet the challenge of global warming and the finite ...

An overview of hybrid magnetic /silicon-based devices that have the capability to be used for processing-in-memory (logic-in-memory) architecture in the immediate future is described in the end. In this article, we have attempted to ...

Energy storage and conversion are vital for addressing global energy challenges, particularly the demand for clean and sustainable energy. Functional organic materials are gaining interest as ...

The ever-growing pressure from the energy crisis and environmental pollution has promoted the development of efficient multifunctional electric devices. The energy storage ...

Molecular toolkit is a crucial part of futuristic spintronics and quantum information technologies. Magnetic bistability is the basis for such applications, which can be achieved by ...

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