

Electrode Materials for Energy Storage and Conversion

Dual performance of fuel cells as Efficient energy harvesting and storage systems

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Abstract:

The need for increased energy security in the nation has diverted energy sources from conventional forms to the use of fuel cells. Fuel cells are generally accepted for electricity generation due to their increased conversion efficiency, reliability, and compatibility with the environment. Fuel cell technology serves dual functions of energy harvesting and energy storage. Fuel cells convert chemical potential energy into electrical energy during the energy harvesting process while its energy is stored in molecular bonds. This chapter discusses the fuel cell system, their working principle, and dual performance of fuel cells for efficient energy harvesting and storage. These fuel cells exhibit advantages and disadvantages which have also been highlighted. The working principle, advantages, classifications, synthesis techniques, and potential applications of fuel cells will be discussed. Different classifications of fuel cells have been described and discussed alongside the methods of operations, merits, and demerits. The dual performance of fuel cells as energy harvesters and energy storage devices, their modes of operation, and useful application areas have been intensively discussed in this chapter.