

Applications of Graphene Nanomaterials in Energy Storage—A State-of-Art Short Review



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Abstract The study presents the usage behavior of graphene in the energy field. Graphene has been comprehensively studied in the energy-related application due to higher conductivity and mechanical flexibility. The architecture of graphene permits it to strengthen and facilitate its application in the energy arena. Herein, the application of graphene in various energy storages such as fuel cells, dye-sensitized solar cells, batteries, nuclear power plants, and thermoelectric has been studied neatly. Graphene reacts towards these substances chemically, mechanically, and electrically to a great extent and appears with the excellent output of these objects. In the future graphene could be applied to the others field of energy and science successfully.

Keywords Graphene · Fuel cell · Solar cell · Battery · Thermoelectric

1 Introduction

Graphene has a large theoretical specific surface area of about $2600 \text{ m}^2 \text{ g}^{-1}$ with superior electrical and thermal properties. Thermal conductivity of graphene of about $\sim 5000 \text{ W m}^{-1} \text{ K}^{-1}$ [1] and electrical conductivity is around $\sim 1738 \text{ S/m}$ that make an impressive effect in the energy field [2]; as for heat transfer application, thermal conductivity is the main influential criteria while electrical conductivity plays the

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