
FLEXIBLE ENERGY STORAGE DEVICE

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ABSTRACT:

Flexible photovoltaic cell (PVC) based on organic polymer are cost effective compared to the production cost of Si solar cells. It is easily disposable and can be designed on a molecular level. However, the current research is focusing on the improvement in efficiency [1]. Reports are available in the literature where carbon is incorporated in polymer based solar cells to develop low cost and light weight flexible devices [2,3]. Furthermore, various inorganic materials exhibit some unique advantages such as good flexibility [4], easy to deposit on the polymers and excellent durability. Again, more efficient solar cells can be realized through the optimization of the organic components. Therefore the focus of the project is to design an optimum structure of a flexible and efficient solar cell that can be fabricated further in a simplest way. Currently graphene has gained a high attention due to its unique properties such as electrical, optical, optoelectronic, and mechanical, which have opened up huge opportunities for applications in designing a flexible solar cell [5,6]. In this work, design, growth, characterization and testing of flexible solar cells are focused. The solar cell structure incorporating graphene is simulated and then fabricated. The graphene synthesized in lab is used to fabricate flexible PVCs. Various parameters such as efficiency, short circuit current, open circuit voltage, and fill factor are calculated by current-voltage characteristics. Graphene is considered as a transparent electrode material [7], highly flexible, an abundant carbon source, and has high thermal/chemical stability, compared to the traditional ITO. Graphene as a flexible transparent electrodes show applications not only in PVC, but also in flexible touch screens, displays, and printable electronics. In addition to working as transparent electrodes, graphene and their derivatives show other important applications that include electron/hole transporters, interfacial layers and Schottky contact in PVC.

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