Nano-Micro Conference

Promoting Science

Abstract View Online

Efficient Solar-Rechargeable Lithium Ion Battery Energy Storage

Qiquan Qiao*

Centre for Advanced Photovoltaics, Electrical Engineering and Computer Science Department, South Dakota State University, Brookings, SD 57007, USA

Corresponding Author. Email: Qiquan.Qiao@sdstate.edu

Received: 11 June 2017, Accepted: 19 June 2017, Published Online: 19 October 2017

Citation Information: Qiquan Qiao, Nano-Micro Conference, 2017, 1, 01030 doi: 10.11605/cp.nmc2017.01030

Abstract

Use of energy storage devices such as lithium ion batteries (LIBs) can help to mitigate the problem of intermittent photovoltaic (PV) power to achieve higher PV penetration into the electric grid. Also, the benefit of deployment of electric vehicles for energy sustainable future seems rather irrelevant unless they are charged using electricity generated from renewables. In addition, large scale practical applications of battery based electric vehicles is still challenging because of the inflexibility it has with the charging stations. All these issues can be addressed by use of solar cells as a viable energy source to charge lithium ion batteries. Here we demonstrate simple, efficient and cost effective photo-charging design approach where the use of promising low cost solar cells such as perovskite solar cell or dye sensitized solar cell with the help of DC-DC power conversion can efficiently charge a $Li_4Ti_5O_{12}$-$LiCoO_2$ LIB.