

其他

组件质量波动对太阳能电池阵列输出特性的影响

秦敬玉<sup>1</sup>,孙成帅<sup>1,2</sup>,谷廷坤<sup>3</sup>

1. 山东大学材料科学与工程学院, 山东 济南 250061; 2. 烟台大学光电信息科学技术学院, 山东 烟台 264005; 3. 山东大学电气工程学院, 山东 济南 250061

摘要:

实验发现光伏电池组件上各单体电池的温度在空间分布是不均匀的,数值上呈正态分布;同时光伏组件的I-U曲线出现异常。本研究认为将组件的温度正态分布作为组件电学参数波动量度是合理的,以此为基础,通过随机方式产生单体电池参数,模拟了光伏电池组件I-U曲线异常现象。使用同样的模拟方法,发现由于光伏组件质量波动一个5kW光伏阵列的最大功率可能200W左右的损失,这说明构建光伏阵列时各组件质量一致性需要重视。

关键词: 太阳电池 温度分布 质量波动

Influence of the fluctuation of module parameters on the output properties of photovoltaic arrays

QIN Jing-yu<sup>1</sup>, SUN Cheng-shuai<sup>1,2</sup>, GU Ting-kun<sup>3</sup>

1. School of Materials Science and Engineering, Shandong University, Jinan 250061,China; 2. School of Opto electronic Information Science and Technology, Yantai University, Yantai 264005, China; 3. School of Electrical Engineering, Shandong University, Jinan 250061, China

Abstract:

By experiments, it was found that each solar cell in the photovoltaic (PV) module generally had different temperatures whose value could be well approximated by normal distribution. The abnormal behavior in the I-U curve was also observed. This study showed that it was reasonable to employ the relative standard error of the temperature as that of the electrical parameters of PV modules. Based on this assumption, cell parameters were randomly generated, and then the abnormal behavior in the I-U curve was well simulated by the series connection of these cells. The same method was applied to a virtual 5 kW PV array, and the power loss was estimated around 200W due only to the electrical parameter fluctuation. The results revealed that the consistency of the electrical parameters of the PV modules should be stressed in the construction of a large PV array.

Keywords: solar cell temperature distribution quality fluctuation

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作者简介: 秦敬玉(1967-),男,山东聊城人,教授,博士,主要研究方向为液态金属结构和能源材料研究.E-mail: qinjy@sdu.edu.cn

作者Email:

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