



发光学应用及交叉前沿

基于电致发光影像的太阳能电池瑕疵检测

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摘要： 太阳能电池制造的复杂性决定其在制造过程中会有很多瑕疵产生,瑕疵的存在会大大影响太阳能电池的发电效率和使用寿命。本文运用电致发光影像技术来凸显瑕疵,针对影像中的瑕疵人工检测率低且缺乏客观性的问题,选用了基于统计的瑕疵检测算法。检测时,选取扩展Haar特征作为样本像素点的特征值,应用改进的模糊C均值聚类法对正常样本进行分群训练,通过判断测试样本是否在正常样本群组之中的方法实现了样本的瑕疵检测,并近似地给出了瑕疵位置。实验结果表明,该方法对太阳能芯片电致发光影像中瑕疵的总辨识率可以达到96%。

关键词： 太阳能电池 电致发光影像 模糊C均值聚类 瑕疵检测

Solar Cells Defect Detection in Electroluminescence Images

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Abstract: The defect will be introduced inevitably during the complexity manufacturing process of the solar cell. The existence of the defect significantly affects generating efficiency and service life. In this paper, the electroluminescence imaging technology is applied to highlight the defect. Aiming at the low rate of artificial detection and deficiency of objectivity, the algorithm of detecting defect which is based on statistics is proposed. In detection, the extensional Haar features are selected as the feature values of the pixel points. The improved fuzzy C-means clustering method is used to cluster the normal samples. By judging whether the testing sample is in the cluster of normal samples, the defect detection is carried out, and the location of the defect is provide at the same time. Experimental result shows that the total recognition rate of the defect in the electroluminescence image of solar cell is 96%.

Keywords: solar cell electroluminescence images fuzzy C-means defect detection

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