Pv Sol Crack [VERIFIED]

the results obtained from raman spectroscopy technique are shown in fig. 12. from this figure, it can be easily seen that there are no defects and cracks present on the solar cell. the surface of the solar cell is free from any foreign materials. furthermore, the cell has the maximum raman response peak at 532.8nm for the cell without a crack; this peak is known as the g-band, which is the most commonly used peak in the raman spectroscopy to analyze the crystallinity of a solar cell. this test is an attempt to observe the effects of crack percentage on the solar cells' performance. the solar cells have been taken off the receiver at the end of the experiment. these cells have been compared to solar cells with the same characteristics and installed for two months at the pv site. the solar cell with the highest percentage of crack has developed the hotspot over time. thus, a clear correlation between the crack percentage and the hotspot formation over time has been found (see fig. 8 b). the solar cell affected by a crack is not only exhibiting a higher temperature than the cell without a crack, but also, it is hotter than a similar cell without cracks in the same position. this result is shown in fig. 8 b. so, it is shown that, for the case of a crack percentage of 7% in solar cell, the surface temperature at the end of the experiment reaches up to the level of approximately 100c and the cell is exposed to the solar radiation. this cell has a hotspot. when the crack percentage is high, it is known that the thermal gradient is higher and the solar cell is more affected by the temperature. therefore, the temperature of the solar cell is greater than that of the case of a similar solar cell without a crack. this is the typical phenomenon observed when a solar cell with a crack is exposed to the solar radiation. the hotspot is the area that is usually developing at the highest temperature of the solar cell. this is when the cell is not exposed to the sun, the solar cell is still hot and the hotspot is the surface area of the solar cell where the temperature is greater than the rest of the solar cell. when the solar cell is exposed to the sun, the solar cell will absorb more heat than it can absorb during the day. this causes the temperature of the cell to increase. it is shown that the crack percentage (the percentage of the crack that is visible from the top surface) directly affects the temperature of the solar cell. the solar cell with a crack percentage of 7% has developed a hotspot. in addition, a corresponding hotspot has also been observed in the solar cell with a crack percentage of 46%. this indicates that the hotspot will develop when the crack percentage is more than 20% of the solar cell.

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fig. 13 represents the relationship between the percentage of the pv module that has cracks and the temperature at which the loss increases to 50% of the stc value. here, the solar cell is affected by a 7% crack percentage. it is clear that the loss increases to 50% of the stc value as the stc temperature increases. in fact, it is found that the temperature at which the power loss increases to 50% of the stc value is approximately 22c, which is also the value obtained for the average surface temperature of the cell affected by a 7% crack percentage (fig. 8 a). this result is in agreement with the observations described earlier. as discussed earlier, the temperature increase at the hot spot area of the cell with a 7% crack percentage is lower than that of the cell with a 20% crack percentage. however, the percentage of the pv module affected by a 7% crack percentage is slightly higher than the percentage of the pv module affected by a 20% crack percentage. this may be the reason for the slight discrepancy between the results obtained for the 7% and the 20% crack cells. fig. 14 represents the relationship between the percentage of the pv module that has cracks and the temperature at which the loss increases to 50% of the stc value. here, the solar cell is affected by a 20% crack percentage. it is clear that the loss increases to 50% of the stc value as the stc temperature increases. in fact, it is found that the temperature at which the power loss increases to 50% of the stc value is approximately 40c, which is also the value obtained for the average surface temperature of the cell affected by a 20% crack percentage (fig. 8 b). 5ec8ef588b