Carrier Conducting Path in the Crystalline Silicon Solar Cells

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Current-voltage (I-V) measurements of crystalline silicon solar cells was conducted under dark conditions with the temperature range of 260 K∼350 K. Using the calculation method, we extracted the crucial factors of ideality factor (n) and activation energy (Ea) to investigate the carrier conducting path in the space charge region (SCR) and the quasi-neutral region (QNR). Values of n were decreased with increasing temperature in both SCR and QNR. We also conformed that the value of Ea of SCR was larger than that of QNR about 0.4 eV. The temperature dependence of n indicates that the carrier conducting path is dominated by carrier recombination-generation in the SCR region than in the QNR region.

Keywords: Solar cells, Ideality factor, Activation energy