

Stability analysis of solar cell characteristics above room temperature using indium nitride based quantum dot

Abstract

This study represents the improvement of stability of solar cell characteristics above room temperature. We have analyzed theoretically the temperature dependence of three major characteristics of solar cell using Ge and InN based quantum dot in the active layer of the device structure. Among the major characteristics of solar cell we have investigated the rate of change of open circuit voltage, short circuit current and the output power of solar cell with respect to temperature. Numerical results obtained are compared. The comparison results reveal that the rate of change of open circuit voltage, short circuit current and output power have been reduced significantly using InN based quantum dot in the active layer of the solar cell. Hence the improvement in stability of these characteristics above room temperature has been achieved by using InN based quantum dot in the active layer of the solar cell.

Keywords

Open circuit voltage; Output power; Quantum dot; Short circuit current; Solar cell