

Abstract

It is well known that natural dust accumulation on photovoltaic (PV) panels from outdoor environment mostly in northern part of Nigeria can obscure the solar radiation from reaching the solar photovoltaic panel, therefore decreases the power output and the efficiency of the panel. This study is based on the effects of dust particles accumulation on the performance of solar photovoltaic panels and also to remove dust particles accumulation on the surface of PV panel using mitigation method that require minimum amount of energy and less use of water. The research was conducted to determine the influence of dust particle accumulation on solar panel with constant light source deliver by halogen lamp, to establish the output power generated and the efficiency. It was concluded from the study results that dust accumulation on the surface of PV panel can reduce solar panel system efficiency by up to 30-50%. It was notice that the output power of the solar panel after cleaning with pressurized water and soap is 2.31 W, water and surfactant is 2.295 W, while the output power for solar panel surface coated with thin glass nano-structure is 2.43 W. The results clearly show that Coating the surface of PV panel with conducting material is the best method to mitigate dust accumulation. This method has good advantages since water is not require, which is rare and quite expensive in northern part of Nigeria