Ambientannealing influences upon optical, structural and electrical properties ofthermal evaporated MoO_x thin films for high efficiency crystallineSi solar cells applications.

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Molybdenum oxide (MoOx) thin films were prepared onthe silicon (Si) and glass substrate by thermal evaporation. MoO_x/Sipost deposition annealing (PDA) was carried out at Ar, O_2, $H_2$and N_2 ambient annealing. The optical, structural,composition and electrical properties of MoO_x thin films weremodified by varying the atmospheric ambient annealing and temperature. Opticalbandgap (E_g), transmittance and reflectance of the MoO_xfilm were varied with thickness and ambient annealing. Scanning electronmicroscopy (SEM), X-ray diffraction (XRD) and X-rays photoelectron spectroscopy(XPS) analysis confirmed the crystallinity and chemical composition, oxygendefective states of the MoO_x films. The Ar ambient annealingcontrolled of MoO_x stoichiometric and control Mo cations binds to Mo^{+6}states as compared with O_2, H_2 and N_2 ambientannealing. The transient photo-conductance decay measurement confirmed thelifetime and implied voltage (V_{oc}) of the Si changes from 5 to 125μs and 580 to 660 mV by deposit 15 nm thick MoO_x films. The currentdensity (J_{sc}) and fill factor (FF) of Si was increased by deposingthe MoO_x films. These results motivating that MoO_x as anemergenceing material to utilized in the Si solar cell for high archiving thehigh efficiency solar cell applications.

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