Optimization of AZO/ZnO/Cu2O Thin Film Heterojunction Solar Cell with Gaussian Defect

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Abstract : In the present article, we report on the simulation study of defected n+-n-p heterojunction metal oxide (MO) thin film solar cell. In the structure, the natural p-type cuprous oxide (p-Cu2O) thin film as an absorber layer is conducted with the natural n-type zinc oxide (n-ZnO) thin film as a buffer layer and a transparent conducting aluminum-doped zinc oxide (n+-AZO) thin film at the front of the n-ZnO buffer layer to verify the function of the window layer. The update xwAMPS version of AMPS one-dimensional simulator has been used to optimize the feasibility of n+-AZO/n-ZnO/p-Cu2O solar cell under air mass AM1.5 illuminations and 300K of temperature. The impact of the Cu2O absorber layer thickness in the n+-n-p heterojunction MO solar cell is investigated and hence, the performance of the n+-AZO/n-ZnO/p-Cu2O structure with gaussian defect is optimized.

Keywords : Cu2O, ZnO, AZO, Gaussian defect, heterojunction, J-V data, wxAMPS