

Nanostructured surfaces

TiO₂/Cu₂O heterojunction for PV application

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Metal oxide semiconductors are promising for photovoltaic applications; many metal oxide semiconductors are abundant, non-toxic and chemically stable which allows material deposition under ambient conditions. The metal oxide semiconductors are already widely used as active or passive components in a broad range of available commercial applications such as active channel layer in transistors that constitute the active matrix of displays or in solar cells as transparent conducting front electrodes and as electron or hole transport layers [1].

The perspective can be TiO₂ and Cu₂O layers because they are cheap in obtaining and not degraded in time. In this work the optical properties of TiO₂ layers growth for different conditions by PVD method were studied for to determine the most photosensitive material. Also the optical study was performed for different Cu₂O layers for optimization of growth parameters.

For selected optimal growth parameters for Cu₂O and TiO₂ the sandwich Cu₂O/TiO₂/ITO/glass layers were obtained. This layers were study by optical spectroscopy and also current-voltage characteristic were obtained. For one of the sample the photosensitivity for lighting was observed.

[1] M Pavan, S.Rühle, A.Ginsburg, D.Keller, H.Barad, P.Sberna, D.Nunes , R.Martins, A.Anderson, A.Zaban, E.Fortunato, Solar EnergyMaterials&SolarCells132(2015)549–556