Photoelectrochemical studies of Ni(II)/γ-Bi_2O_3 photoanode in $Fe(CN)_6^{3-/4-}$ and Na_2SO_4 electrolyte

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γ- Bi_2O_3 is rarely studied material for photoelectrochemistry. γ- Bi_2O_3 was doped with Ni(II) ions by sintering technique and characterized by DRS, IR, TEM, SAD, EPR and surface area analyzer. Photoanode of Ni(II)/ γ- Bi_2O_3 was prepared by pelletizing the powder of Ni(II)/ γ- Bi_2O_3 and sintering and polishing of the pellet and ohmic contact was made with In-Ga eutectic alloy and a Cu wire was connected to this unexposed side with silver paint. The photoelectrochemical (PEC) studies of the photoanode were done by using the redox couple, $Fe(CN)_6^{3-/4-}$ and Na_2SO_4 solution as the supporting electrolyte. I^2_{ph} vs V from PEC studies revealed that the flat band potential is –0.3V vs SCE and effect of wavelength of radiation was studied. This studies revealed that 470 nm is the maximum quantum efficiency and denotes that the band-gap energy is 2.64 eV. Effect of light intensity and scan rate variation for PEC studies revealed that the photocurrent increases with increase in light intensity. Cyclic voltammetric studies of Ni(II)/ γ- Bi_2O_3 photoanode in dark and light radiation were carried out. PEC studies of Ni(II)/ γ- Bi_2O_3 with 5Hz and 8Hz light chopped radiation were carried out.