

## ABSTRACT

Hydrogen gas evolution was observed for the first time from a photoelectrochemical cell using a n-type  $\text{Cu}_2\text{O}$  photoelectrode under visible light irradiation. Three-electrode configuration was used in the photoelectrochemical cell to observe  $\text{H}_2$  evolution.  $\text{AgCl/Ag}$  calomel electrode and a platinum plate were used as the reference and counter electrodes, respectively.  $\text{Fe}^{2+}/\text{Fe}^{3+}$  redox couple was used as the electrolyte.  $\text{H}_2$  evolution was visible on the platinum electrode in the photoelectrochemical cell.

p- $\text{Cu}_2\text{O}$  films were prepared on copper plates by heating in the air at  $850\text{C}^\circ$  for 3min followed by rapid quenching in a  $10^{-3}$  M aqueous  $\text{CuSO}_4$  solution. Continuous immersion of this plate in the  $\text{CuSO}_4$  solution after quenching, facilitates to form p- $\text{Cu}_2\text{O}$  crystallites on the surface of thermally grown p- $\text{Cu}_2\text{O}$  films.

Different sizes of crystallites were obtained controlling the length immersion time, in the  $\text{CuSO}_4$  solution. These films were characterized by XRD, SEM, absorption spectra, photocurrent action spectra, V-I characteristic curves and applying to p-CuSCN sensitized photoelectrochemical cells from this study.