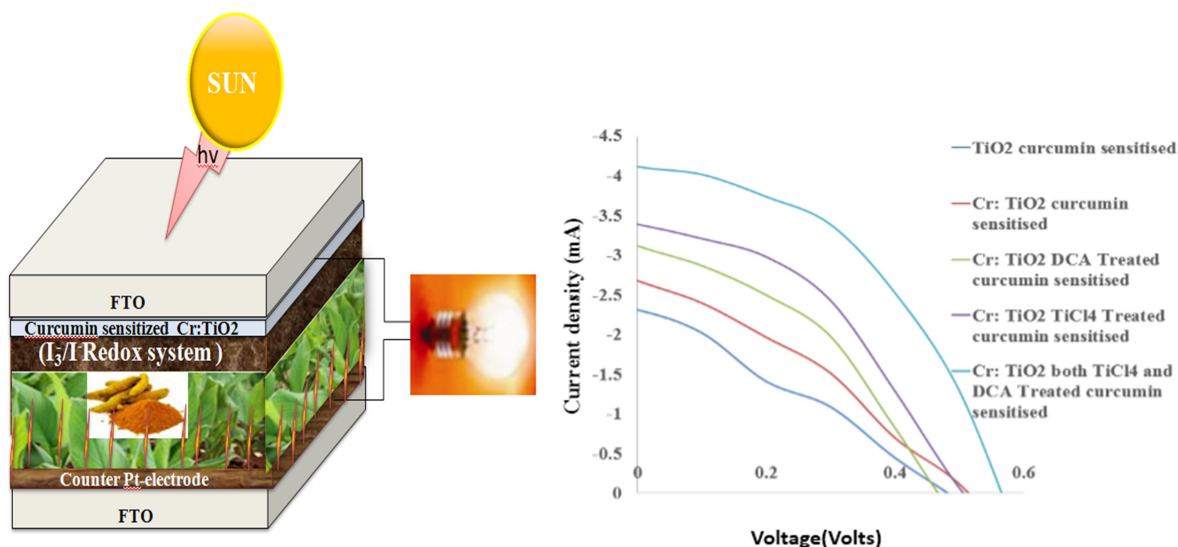


Chromium doping in Titania for making Dye Sensitized Solar cell with improved efficiency and stability

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Abstract

Dye-sensitized solar cell was fabricated by modifying photo anode with chromium doping in titanium dioxide prepared by sol-gel technique. Photo-anode was treated with TiCl₄ and pre-sensitization with deoxycholic acid (DCA) for enhancement in its short circuit current (J_{sc}) and open circuit voltage (V_{oc}). Quasi solid state electrolyte was used for improving its stability. The observations reveal that Cr-doped TiO₂ inhibits the phase transformation, increase the surface area and decrease the crystallite size as is evidenced by its X-ray diffraction (XRD) /Raman spectrum. Under open solar radiation of 100 mW/cm² (1 SUN) in ambient condition, J_{sc} gets enhanced from 2.31 mA to 4.11 mA and V_{oc} from 0.42 V to 0.58 V due to modification in photo-anode. The overall efficiency (η) enhanced by 200%.

Key Words: Sol gel technique, chromium doping, curcumine, sensitization, chemical treatment, conversion efficiency, quasi solid state electrolyte