

Electrochemical Properties of Photoelectrode using Transition Metal doped TiO₂ Particles for Dye-sensitized Solar Cells

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The effect of transition metal added TiO₂ hydride photoelectrode in performance of dye sensitize solar cell (DSSC) had been studied with adding different wt. % of transition metal ion. P25 TiO₂ nano particles structure was dominated by rutile whereas transition metal ion adding film were dominated by anatase structure in which relative peak intensity depends on characteristic of additive metal ion in TiO₂. Field-emission scanning electron microscopy (FE-SEM) observation showed diffusion and possible attachment of TiO₂ particles with metal atoms in morphology. Initially about 16% and 35% increase in I_{sc} was observed respectively for 5wt. % transition metal added TiO₂ photoelectrode. Higher wt. % ratio had decrease the I_{sc} value in both the cases and for transition metal ion adding it can be increased than using only TiO₂ photoelectrode. The increase in efficiently in hydride TiO₂ photoelectrode may be due to increase in light scattering properties of transition metal and creation of possible energy barriers by transition metal which can prevent the recombination reactions.