

4th International Conference on **Nanotek & Expo**

December 01-03, 2014 DoubleTree by Hilton Hotel San Francisco Airport, USA

Wide band gap quantum dots sensitized α -Fe₂O₃ thin film for solar generation of hydrogen

Ashi Ikram, Sonal Saha^a, Snigdha Rai, Sahab Dass, Rohit Shrivastava and Vibha R Satsangi
Dayalbagh Educational Institute, India

Conversion of solar energy into the hydrogen via photoelectrochemical (PEC) splitting of water is expected to fulfill the future energy demand. Today, a major impediment in the commercial viability of PEC splitting of water is its low efficiency exhibited by existing semiconductor photoelectrodes. In the search of suitable semiconductor, use of quantum dot modified metal oxide semiconductor needs to be explored. Quantum dots (QDs) are identified for their unique optical, electrical and chemical properties, which makes it applicable in solar energy applications. In this paper, hematite has been chosen as a main solar energy absorber, while ZnO QDs decorated over it, as an efficient electron transport across the interface by reducing charge carrier recombination rate. In the present study, doped hematite films have been synthesized by electrodeposition method. These films were subjected to sensitization by ZnO quantum dots, prepared by chemical route, for 24, 48, and 72 hours. These sensitized films showed a significant increase in the photocurrent density as compared to unsensitized film in PEC cell. Red shifts in the absorption band edge and reduction in carrier recombination rate may be the major factors responsible for this enhancement. XRD confirmed the presence of hematite with rhombohedral structure and ZnO's with hexagonal structure, both in polycrystalline form. Size of ZnO QDs was ~11 nm, as examined by HRTEM. FE-SEM images confirmed the fact that pores of hematite have been filled with ZnO QDs. The enhanced photo response has also been supported by increased negative value of flat band potential after sensitization.

Biography

Ashi Ikram is currently pursuing PhD from Dayalbagh Educational Institute, India in the field of Material Science. She has qualified National Eligibility Test for JRF/lectureship in 2012 conducted by university grant commission and currently. She has published 3 papers in the international SCI journals and attended many national conferences.

ash.ikra@gmail.com