Aryan Azad et al., J Fundam Renewable Energy Appl, 5:6
http://dx.doi.org/10.4172/2090-4541.C1.005

OMICS International
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International Conference on
Green Energy & Expo
September 21-23, 2015 Orlando, USA

Enhanced hematite-based photoelectrochemical water splitting by comparing coating and doping methods

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According to the global energy problem one of the solutions can be renewable solar hydrogen which is produced by splitting water and solar energy. Hematite (α-Fe_2O_3) thin films and Ti-doped hematite were grown on Fluorine thin oxide (FTO) substrate by hydrothermal method. On the other hand TiO_2 and Fe_2O_3 were coated by layer by layer (LBL) method on Fluorine thin oxide (FTO) glasses. Samples were heat treated in different temperatures between 550°C and 750°C with various times between 10 min and 2h. The photoelectrochemical performances of undoped and doped hematite and coated FTO glasses by TiO_2 and Fe_2O_3, were characterized and compared by X-ray characterization (XRD), optical band gap energy, photocurrent density (*I-V*) and field emission scanning electronic microscopy (FESEM). It has been demonstrated that the photoelectrochemical performance of Ti-doped hematite on the FTO glass, which was sintered in air at 550°C for 2 h and annealed at 750°C for additional 10 min, illustrated significantly high photo catalytic activity by increasing photocurrent density, decreasing the band gap energy and reducing electron-hole recombination.

Biography

Aryan Azad was born in 1985. In 2008 and 2011 she obtained B.Sc. and M.Sc. in Textile Chemistry Engineering. Ms. Azad became top class honor student amongst the students graduated in the Textile Chemistry Engineering in both bachelor and master courses. Currently she is PhD student in Nano Technology and Advanced Materials Engineering department in Sejong University, Seoul, South Korea. She also has some publications in both Nano Technology and Textile science.

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