Morasae Samadi et al., J Material Sci Eng 2012, 1:3
http://dx.doi.org/10.4172/2169-0022.S1.007

OMICS Group Conferences
Accelerating Scientific Discovery

International Conference and Expo on
Materials Science & Engineering

October 22-24, 2012 DoubleTree by Hilton Chicago-North Shore, USA

Fabrication, optical and photocatalytic properties of a new visible light active electrospun ZnO/Carbon nanofibers

Morasae Samadi, Ali Pourjavadi and Alireza Moshfegh
Sharif University of Technology, Iran

As spun nanofibers were fabricated by electrospinning of polymer precursor solution containing polyvinyl alcohol/ zinc acetate. Novel ZnO/carbon nanofibers were prepared by annealing the as spun nanofibers in the nitrogen atmosphere. For investigation the effect of carbon presence in the samples, pure ZnO nanofibers were also prepared by annealing the as spun nanofibers in the air. The field emission scanning electron microscopy (FESEM) images indicated the smooth and beadless nanofibers. The wurtzite crystal structure of the nanofibers obtained by using x-ray diffraction (XRD). The band gap energy was estimated by diffuse reflectance spectroscopy (DRS) and Tauc model; and the results revealed band gap narrowing as a result of the carbon presence. Thermal gravimetric analysis (TGA) and differential thermal analysis (DTA) were used to investigate thermal behavior of the samples. Brunauer-Emmett-Teller (BET) data showed the carbon content in the nanofiber reduced the surface areas. The formation of Zn–O and Zn–OH bonds in the nanofiber surfaces was approved by X-ray photoelectron spectroscopy (XPS). The possible photo-degradation mechanism was studied by the examination of photocatalytic property in the presence of tert-butyl alcohol (t-BuOH) and I^- anion as $^{\bullet}OH$ radical and hole (h^+) scavenger. The results showed that photo-degradation of methylene blue molecules occurred by photo-generated electron. The existences of carbon in the nanofibers lead to the photocatalytic activity of the nanofiber under visible light.

Biography

Morasae Samad is a Ph.D student at Sharif University of Technology in Iran.Ali Pourjavadi completed his Ph.D at Paris VI University. He is a faculty member and chair of Department of Chemistry at Sharif University of Technology in Iran. Alireza Moshfegh completed his Ph.D at University of Houston in USA. He is a faculty member of Department of Physics at Sharif University of Technology in Iran.

samadi88@gmail.com