World Academy of Science, Engineering and Technology
International Journal of Materials and Metallurgical Engineering
Vol:8, No:05, 2014

Fabrication of Titania and Thermally Reduced Graphene Oxide Composite Nanofibers by Electrospinning Process

Authors : R. F. Louh, Cathy Chou, Victor Wang, Howard Yan

Abstract : The aim of this study is to manufacture titania and reduced graphene oxide (TiO2/rGO) composite nanofibers via electrospinning (ESP) of precursor fluid consisted of titania sol containing polyvinylpyrrolidone (PVP) and titanium isopropoxide (TTIP) and GO solution. The GO nanoparticles were derived from Hummers' method. A metal grid ring was used to provide the bias voltage to reach higher ESP yield and nonwoven fabric with dense network of TiO2/GO composite nanofibers. The ESP product was heat treated at 500°C for 2 h in nitrogen atmosphere to acquire TiO2/rGO nanofibers by thermal reduction of GO and phase transformation into anatase TiO2. The TiO2/rGO nanofibers made from various volume fractions of GO solution by ESP were analyzed by FE-SEM, TEM, XRD, EDS, BET and FTIR. Such TiO2/rGO fibers having photocatalytic property, high specific surface area and electrical conductivity can be used for photovoltaics and chemical sensing applications.

Keywords : electrospinning process, titanium oxide, thermally reduced graphene oxide, composite nanofibers
Conference Title : ICMSE 2014 : International Conference on Materials Science and Engineering
Conference Location : Amsterdam, Netherlands
Conference Dates : May 15-16, 2014