Hussein Alrobei et al., Res. Rev. J Mat. Sci. 2017, 5:7
DOI: 10.4172/2321-6212-C1-011

The improved photoelectrochemical properties using α-hematite -molybdenum disulfide nanostructured material

Hussein Alrobei and **Manoj K Ram**
University of South Florida, USA

The alpha (α)- hematite (Fe_2O_3) nanomaterials are attractive due its optical, electrical, and photoelectrochemical (PEC) properties. Several transition metal ions (Ti, Al, Pt, Zn etc.) have been doped to enhance low conductivity, surface kinetic, carrier diffusion, and decreasing of the photocorrosion. However, little attention is paid to dope dichalcogenide 2D- molybdenum disulfide (MoS_2) with α-Fe_2O_3. The MoS_2 has shown interesting photo-activity due to its bonding, chemical composition and doping properties. So, we have synthesized nanocomposite α-Fe_2O_3-MoS_2 using sol-gel technique. The α-Fe_2O_3- MoS_2 nanomaterial was characterized using combination of physical techniques such as SEM, X-ray diffraction, UV-vis, FTIR and Raman techniques, respectively. The photocurrent, electrode/electrolyte interface of α-Fe_2O_3-MoS_2 nanocomposite films were investigated using electrochemical techniques. The rhombohedral structure with lower band gap is obtained using X-ray diffraction and UV-vis measurements for α-Fe_2O_3-MoS_2 films. Besides, α-Fe_2O_3-MoS_2 film revealed improved hydrogen production compared to α-Fe_2O_3 as well as aluminum doped α-Fe_2O_3 nanostructured films. Later, mechanism of photoelectrochemical water splitting in nanocomposite α-Fe_2O_3-MoS_2 films is understood through band diagram.

Biography

Hussein Alrobei is a Ph.D student under the supervision of Manoj K Ram. He has background in the field of photoelectrochemical, advanced materials, polymers and energy. He has been involved on photoelectrochemical properties on various metal oxides, polymers and conducting polymers, and recently his patent on nano-hybrid structured regioregular polyhexylthiophene blend films for production of photoelectrochemical energy has been approved.

alrobei@mail.usf.edu

Notes: