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**Aluminum- $\alpha$ -hematite nanocomposite films for photo electrochemical applications****Hussein Alrobei and Manoj K Ram**  
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The alpha ( $\alpha$ )-hematite ( $\text{Fe}_2\text{O}_3$ ) based photoelectrochemical (PEC) devices are attractive due to splitting of water into hydrogen and oxygen, and it has been studied extensively due to its bandgap, cost effectiveness, chemical stability and availability in nature. However,  $\alpha\text{-Fe}_2\text{O}_3$  shows low carrier diffusion, higher resistivity, low electron mobility and higher photocorrosion. The mobility and carrier diffusion properties of  $\alpha\text{-Fe}_2\text{O}_3$  can be improved by transition metal ion doping or making composite with metal oxide. So, attempt is made to make  $\alpha\text{-Fe}_2\text{O}_3$  composite with aluminum (Al). Various ratios of Al with  $\alpha\text{-Fe}_2\text{O}_3$  composite nanomaterials were synthesized using a sol-gel method. The Al- $\alpha\text{-Fe}_2\text{O}_3$  nanomaterial was characterized using SEM, FTIR and UV-vis techniques and X-ray diffraction, techniques. The cyclic voltammetric study was performed in three electrode cell where Al- $\alpha\text{-Fe}_2\text{O}_3$  worked as working electrode coated on conducting FTO glass plate, steel as counter and Ag/AgCl as reference electrode to estimate the diffusion coefficient and understanding of electrode/electrolyte interface. The Al doping has shown changes in the structural, optical, morphological and electrochemical properties of Al- $\alpha\text{-Fe}_2\text{O}_3$  compared to pristine  $\alpha\text{-Fe}_2\text{O}_3$  photocatalyst. The photoelectrochemical properties of Al- $\alpha\text{-Fe}_2\text{O}_3$  based electrode has been understood through band diagrams. The photocurrent and band gap has clearly shown the improved hydrogen generation using Al- $\alpha\text{-Fe}_2\text{O}_3$  photocatalyst.

**Biography**

Hussein Alrobei is a PhD student under the supervision of Manoj K Ram. He has background in the field of Photo Electrochemical, Advanced Materials, Polymers and Energy. He has been involved on photo electrochemical properties on various metal oxides, polymers and conducting polymers, and recently his patent on nano-hybrid structured regioregular polyhexylthiophene blend films for production of photo electrochemical energy has been approved.

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