

Enhancement of photo catalytic performance by Fe@Fe<sub>2</sub>O<sub>3</sub> core-shell structure

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Now days, the most of energy is come from fossil fuel. The demand of fossil fuel is increasing. But, Fossil fuel has several problems. It means development of renewable energy is unavoidable. Among many energy sources, hydrogen is promising source and PEC cell is used as a effective way of water splitting.

Among many materials, hematite is one of the most promising as a photo anode material. It has proper bandgap and good chemical stability and low price. Despite of these advantages, also hematite has some disadvantages. It has short diffusion length of charge carrier, poor oxygen evolution reaction kinetics. The short diffusion length of hole can be overcome by nanostructure. Also fast separation of hole and electron also can be helpful to overcome the short diffusion length of charge carrier.

To overcome the problem, the Fe@Fe<sub>2</sub>O<sub>3</sub> core-shell structure would be synthesized to minimize recombination. The FeOOH synthesized on the FTO glass than the FeOOH would be reacted with hydrogen as reduction reaction to be iron. I will oxidize the surface of FeOOH or coat Fe<sub>2</sub>O<sub>3</sub> on the iron by CVD or sputtering.