Dye-sensitized Iron-oxide Solar Cells: Preparation of Nanomaterials and Fundamental Properties of Solar Cells

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Global warming and fossil fuel depletion have urged extensive researches towards renewable energies around the world. Dye-sensitized solar cells (DSSC) are low-cost photovoltaic devices to generate electricity from renewable solar energy. Among versatile semiconductors employed as DSSC electrodes, metal-oxides are the most common and diverse materials because of their extensive structural/physical/chemical properties and photovoltaic functions. Here, iron oxide nanomaterials were synthesized by plasma methods. Their structure, morphology, grain size, and optical properties *etc* were characterized by various technologies. The metal-oxide nanomaterials were then fabricated into DSSC devices. Photovoltaic properties of the DSSC devices were reported and fundamental mechanics were discussed.