

## IIT Hyderabad scientists develop low-cost, eco-friendly solar cells using kumkum dye

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In a unique and key breakthrough, IIT Hyderabad scientists have developed low-cost and environment friendly solar cells. These solar cells have been developed using eco-friendly materials such as kumkum dye. These solar cells have been given the name of Dye-Sensitised Solar Cell (DSSC) by the team. The team of scientists behind the development of new solar cells used off-the-shelf dye used to make kumkum or vermilion in India. According to the information provided by the institute, the solar cells were developed using New Fuchsin (NF) dye which was used along with aqueous electrolyte and platinum-free counter electrodes. The research paper regarding the development of DSSC has been published in the Solar Energy journal. Typically, solar cells are made using silicon, but it due to high cost of processing silicon, the fabrication cost for such solar cells is also very high. Additionally, as the silicon based solar cells are to be produced using high-temperature methods, the carbon footprint left after production of such cells is also higher. The team of scientists at IIT Hyderabad stated working on solar cells based on organic materials to overcome these challenges posed by silicon based solar cells. Additionally, the solar cells developed using organic materials are more cost-effective and easy to manufacture, as compared to the silicon ones. Professor Sai Santosh Kumar Raavi from Department of Physics, Indian Institute of Technology (IIT) Hyderabad, who led the project at the institute, narrated the journey of the team and the challenges encountered by them. He said that the team faced several drawbacks impeding the organic photovoltaic technology as organics (plastic) are less robust. Additionally, the team also faced problems with the dye molecules used for DSSC as they would turn toxic upon ingestion. He further added that since 2010, many efforts have been made to develop water-soluble natural and synthetic dyes to fabricate water-based solar cells. In the latest experiment, Raavi's team used very cheap magenta-dye called New Fuchsin, which is used to make kumkum or vermilion when grounded with turmeric. Using this kumkum dye, team was able to develop cheap, non-toxic and is water-soluble dye that can power a DSSC.

Source: Jagran Josh  
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