Fabricating an Environment Friendly and Low Cost Dye-Sensitized Solar Cell (DSSC) by Utilizing Mangosteen Pericarp as Electron Transfer Dye

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The purpose of our project is to invent an environmentally friendly Dye-Sensitized Solar Cell (DSSC). DSSCs are photo-electrochemical cells based on principles similar to the processes in natural photosynthesis. Although ruthenium-based dye is widely used in DSSCs, it is a toxic heavy metal, therefore we used organic dye to replace ruthenium dye in the current Gratzel cell. The conductive oxide glass was coated with titanium dioxide and then stained with an organic dye obtained from mangosteen pericarp extract. Another piece of conductive oxide glass was then coated with graphite and the two conductive oxide glasses were clipped together with binding clips to complete the cell. The mangosteen pericarp extract contains a biological pigment called xanthones which gives it its distinctive dark purple colour. We tested the ability of this pigment to aid the flow of electrons in the dye sensitized solar cell. Based on the results, the highest voltage produced by the cell was 0.28V. This proved that xanthones have the ability to replace ruthenium-based dyes in DSSCs.

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