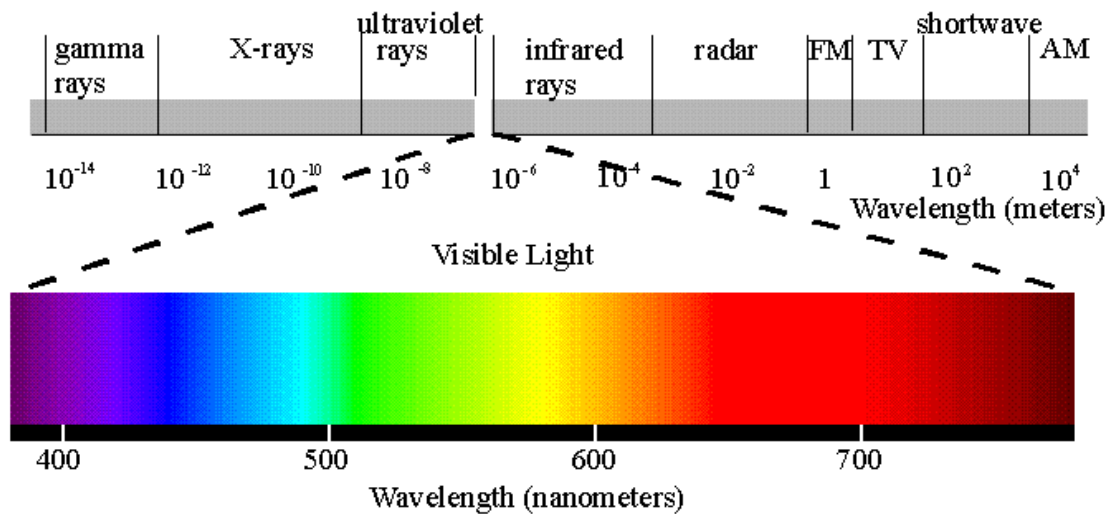


To investigate the effect of current on a Grätzel solar cell using different coloured lights

Introduction

Visible light is part of the electromagnetic spectrum. See below. It is made up of a combination of colours, these are Purple, Blue, Green, Yellow, Orange and Red. The different colours of the spectrum have different wavelengths and energies.



Short Wavelength (0.000000000001m) → Long Wavelength (1m – 100 000m)

Highest Energy → Lowest Energy

As we know, solar cells use the sunlight energy to generate an electrical current. However, the electrical current output can vary on using different colours of light. This is because they have different wavelengths and energies. The emission of electrons in dye molecules wholly relies on sufficient energy being carried by different colours of light.

In this experiment you will investigate the effect of current on using various coloured lights on a Grätzel cell prepared from hibiscus tea.

Materials needed: Grätzel solar cell (hibiscus tea), 2 Crocodile clips, Ammeter, Colour Filters (violet, blue, green, yellow, orange, red) – You can use cellophane, coloured plastic folders or printed acetate sheets.

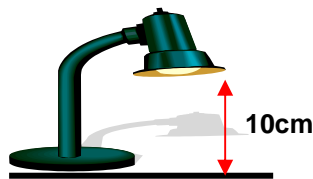
Circuit Symbols:



Experimental:

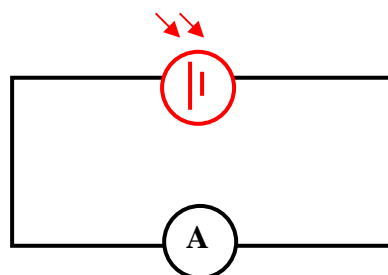
1. Setting up the light source (desk lamp)

- Point the head of the desk lamp onto the bench.
- Using a ruler, measure the distance between the head and the bench top.
- Adjust the head so that there is a 10cm gap.



2. Making current output measurements

- Connect a Grätzel solar cell and an ammeter in series.



- Carefully place the Grätzel solar cell under the light source.
- Measure the current output of white light, without any colour filters. (Make sure the ammeter is set to read μA). Note the reading in the results table.
- Turn the light source and ammeter off.
- Now completely cover the solar cell with a violet colour filter. Turn the light source on and measure the current.

6. Do the same for the other colour filters.

Results:

1. Table of results

Colour	Wavelength / nm	Output Current / μA
White	390 – 780	
Violet	390 – 455	
Blue	455 – 495	
Green	495 – 575	
Yellow	575 – 600	
Orange	600 – 625	
Red	625 - 780	

2. Which colour produced the lowest colour?

3. Why do you think this is?

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