

# Synthetic Chemistry

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# 1 7/10/24

## 1.1 [✓] Colors

**Synthetic dye:** To achieve the desired color humans used dyes. Synthetic ones are superior. The first one is *Maya blue* (not truly synthetic), the first true synthetic dye is *Mauveine* (1856).

**What is color:** Physical property of an object which requires an observer, which is something with *Photoreceptors*: Cones (daytime) and Rods (nighttime). They are not able to distinguish between a monochromatic and polychromatic light.

**Terminology:** Review terms like Hue, Saturation, Spectroscopy and so on.

## 2 9/10/24

### 2.1 [✓] Dye and Functional Dye

Is something that can impart color to a substrate when applied in solution. The functional dye is a dye that also has a specific function in high-technology fields.

**Lambert - Beer:** Remember the Lambert - Beer law:  $A = \epsilon bc$ .

**Experiment:** We'll be using different vials because of their transparency along the walls (the right angle experiment would have one opaque face).

### 3 11/10/24

#### 3.1 [✓] Sun and Solar Panels

We'll be focusing on the Silicon - Inorganic Thin Films - PV (Perovskite) solar panels.

Remember that the LUMO level should be high enough for the current injection, while the HOMO has to be low enough to be replenished.

Study the different photosensitizers requirements.

**Organometallic Photosensitizers:** Oldest method for dyes, there's a research for finding a *Ru*-free metal complexes. We can have based on the ligands a heteroleptic and homoleptic compounds, where an *COOH* group is the anchoring group, while long C chains are a better exchanger with the electrolytes.

## 4 11/10/24: Parte Yum I

### 4.1 [✓] Introduction

**Wien's displacement law:**  $\lambda_{peak} = \frac{b}{T}$ , where  $b = 2.898 * 10^{-3}mK$  or  $b = 2898\mu mK$

## 5 16/10/24: Parte Yum II

### 5.1 [✓] Direct - Indirect gap

**Why Silicon increases its conductivity at higher T:** Because the vibration of the lattice of the metal changes the gap, reducing the probability of getting exactly the energy needed to perform the jump. In semiconductors happens the same thing, but the amount of charge mobility increases much faster.

### 5.2 [✓] Giunzioni p-n

**6 18/10/24**

**6.1 [X] Appunti Aleksej**



## **7 21/10/24**

### **7.1 [✓] DSSC**

There are different types:

- Organo - Metallic
- Metal - Free dyes

**8 22/10/24**

**8.1 [X] Appunti Alice**

## **9 23/10/24**

### **9.1 [✓] Solid state DSSC → Quantum dots**

**Perovskites:** It's all about perovskites, main drawback is that it uses lead.

**Architecture:** There's a device architecture, which involves the substrate, the dye and the glass protection.

### **9.2 [✓] Phototherapy?!**

**10 25/10/24**

**10.1 [✓] Solid state DSSC → Phototherapy 2.0 Appunti Fra**

## **11 30/10/24**

### **11.1 [✓] Bioconjugation**

Is the usage of functional groups to link together different molecules. Difference between peptide and protein is the size (more than 2000 atoms is protein).

## **12 18/11/24**

### **12.1 [✓] LAB part**

#### **12.1.1 E1**

Use SCI FINDER, WEB OF SCIENCE, REAXYS, SCOPUS to collect info about:

- Type
- Absorbtion
- Evaluation of Stock shift
- NMR

#### **12.1.2 E2**

Again an analyzis of a reaction with microwaves

#### **12.1.3 E3**

Again an analyzis of a reaction of a surfactant

#### **12.1.4 E4**

Somthing with Perovskites.

### **12.2 Research metrics**

- Journal
- Author
- Article

H-index, carino, è il numero di pubblicazioni che sono state citate almeno lo stesso numero di volte.

**13 20/11/24**

**13.1 [✓] Bibliographic research**