Supramolecular Chemistry-I

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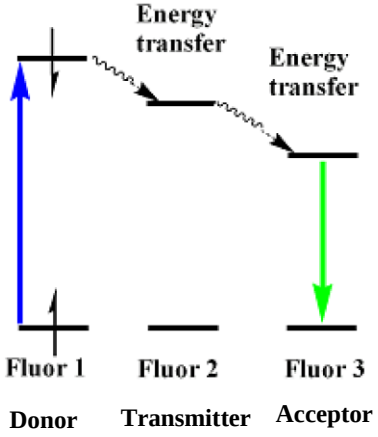
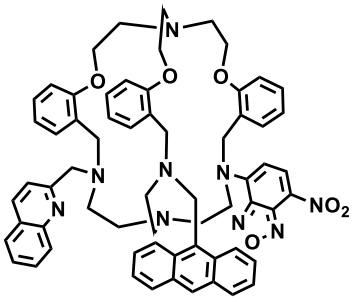
Lecture - 35

Welcome back, I will continue with the FRET because I want you to completely understand this important phenomenon. So, let me first take the example with two fluorophores attached to a cryptand that we talked about last time. In this particular example, we have two fluorophores: anthracene and the diazo compound. We have done the measurement of distance between the fluorophores from X-ray crystallography and compared with the value obtained from FRET data. Data from both came out to be closely similar and around 15.5Å.

Let me now discuss what happens if there are three different fluorophores in a system ?

The Approximate energy level diagram illustrating a two-step FRET process will be as follows:



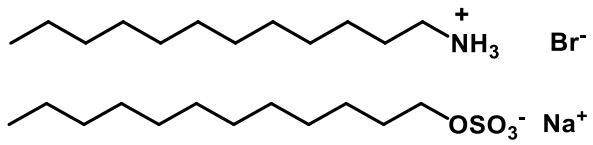


We have here three fluorophores attached to the cryptands such that emission band of quinoline has spectral overlap with the absorption band of anthracene. In turn, anthracene emission band has overlap with diazole absorption band. So, here, anthracene fluorophore is acting as a transmitter.

Here, if we excite quinoline (fluor1), then we shall see emission from diazole (fluor3) FRET is a very versatile tool in studying biological systems. As such fluorescence has been widely used as sensors, logic gates, and FRET. These are interactions of light with matter. There is another very important use of such interactions: optical nonlinearity. All these studies come under Supramolecular Chemistry.

Now we shall deal with the supramolecular chemistry of amphiphiles. This will conclude Part I of the subject.

What is an amphiphile? An amphiphile has two parts in one molecule: a head group and a tail.



The top one is a cationic amphiphile where NH_3^+ is the hydrophilic headgroup and the hydrophobic long alkyl chain shown is called the tail. The bottom one an anionic amphiphile where OSO_3^- is the hydrophilic headgroup and the long alkyl chain is called the tail. Amphiphiles are also known as surfactants meaning surface active agents. We take up amphiphiles from next lectures. Thank you very much.