Modeling Sensitizer to Annihilator Ratios for Optimal Light Intensity in TTA Upconversion

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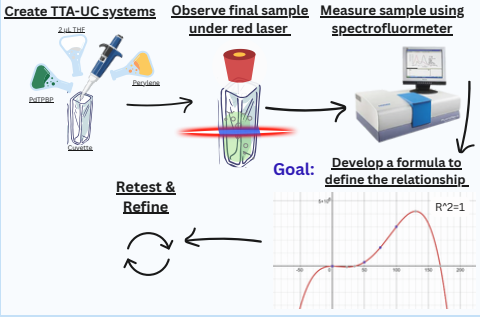
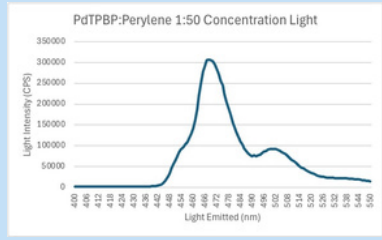
Q: How does the **ratio** between annihilator and sensitizer in a TTA-UC system affect the **peak light intensity** produced?



H: Modeling annihilator-to-sensitizer ratios using Perylene (annihilator) and PdTPBP (sensitizer) against peak light intensity demonstrates a **positive relationship** until light intensity begins to **decrease** due to reabsorption and quenching.

A **nonlinear relationship** exists between the **ratio** of annihilator and sensitizer and the peak **light intensity** produced.

Figure 1: Graph depicts light intensity vs wavelength for 1:50 ratio sample.



10x light intensity

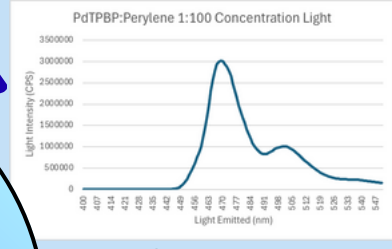
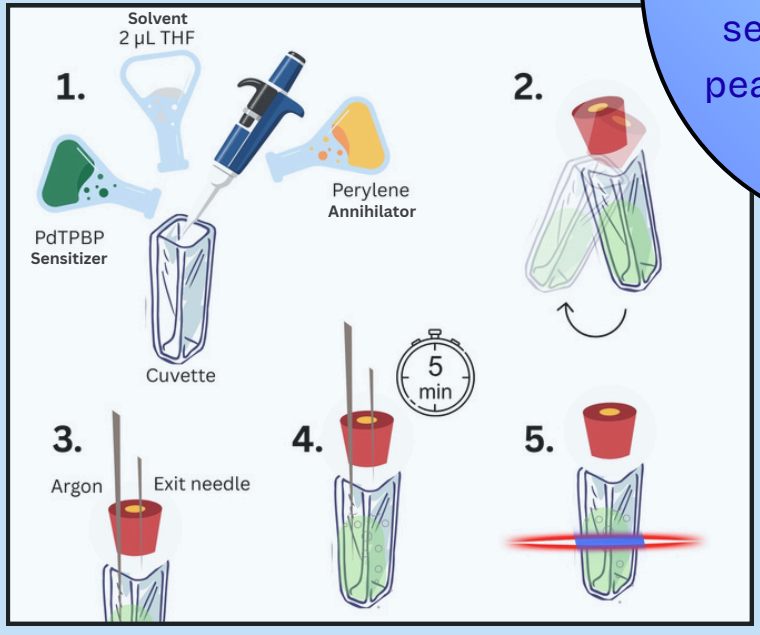


Figure 2: Graph depicts light intensity vs wavelength for 1:100 ratio sample.



As seen in the peak between the 1:50 and 1:100 graphs, the 1:100 ratio has a 892.65% increase in light intensity from the 1:50 ratio. It is evident that for this pairing, the ratio and light intensity are not one-to-one.

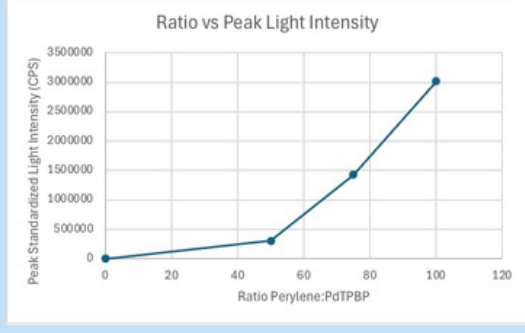


Figure 3: Graph depicts ratio vs peak light intensity collected for 0, 50, 75, 100 ratio samples.

There is an evident nonlinear relationship.