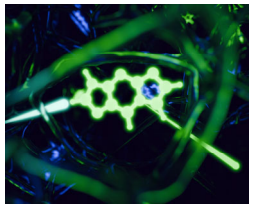
Room Temperature Phosphorescence with Direct Triplet State Excitation

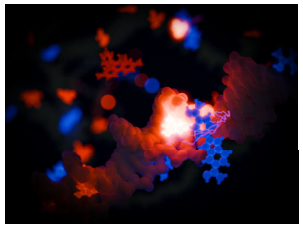
Danh Pham [1] | Bong Lee[1]| Ignacy Gryczynski[1] | Zygmunt Gryczynski [1]
[1]Department of Physics and Astronomy, Texas Christian University, Fort Worth, Texas, USA

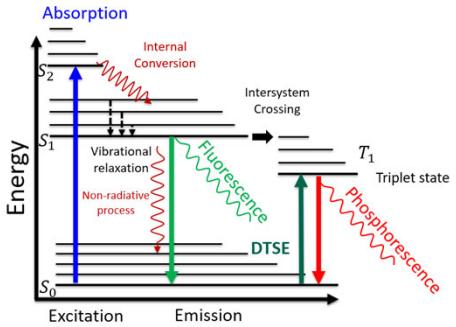
Introduction



- PVA serves as a polymer matrix, which immobilizes dyes
- Immobilization suppresses non-radiative decay, allowing for RTP
- Immobilization increases anisotropy
- In the future, DNA can serve as a matrix, allowing for RTP in solution

- Hoechst 33258 is a DNA intercalator
- Hoechst can be excited via Direct Triplet State Excitation
- DTSE allows longer wavelengths to be used



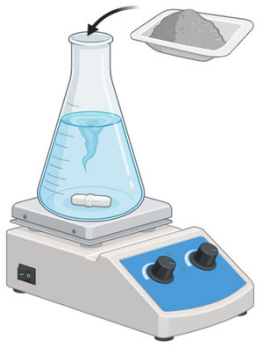


Practical Application

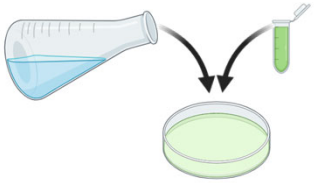
- Use of longer, low-energy wavelengths for medical imaging
- Affordable equipment, diagnostics, and screening
- Crime Scene Investigation

Materials and Methods

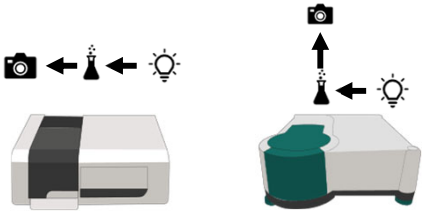
1 Prepare PVA Stock Solution



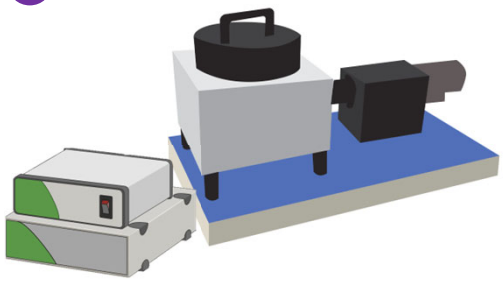
2 PVA Doping & Drying



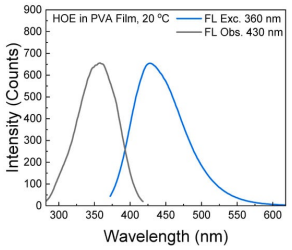
3 Absorption & Fluorescence Measurements

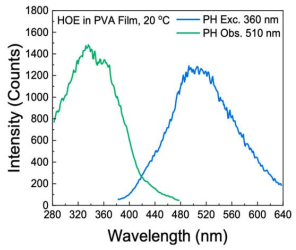


4 Time-Resolved Measurements

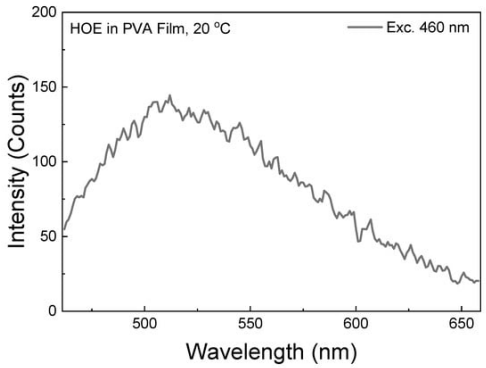


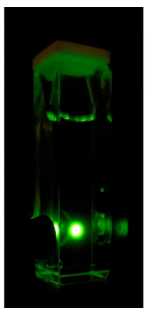
Results: Steady State Measurements



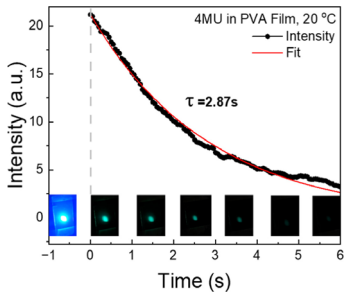


Results: Direct Triplet State Excitation





Results: Time-Resolved Measurements



Conclusion and Outlook

- In utilizing phosphorescence, gated detection eliminates short-lived components such as Raman Scattering and background fluorescence.
- The ability to utilize direct triplet state excitation at room temperature allows for the potential for biological imaging
- Similar to how PVA was used in these experiments, biological structures such as DNA may be used as a matrix in the future for the potential for medical imaging

References

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