Measuring Quenching Efficient Constants

Darleen Tanita

Department of Chemistry and Materials

Institute for Polymers and Organic Solids

Director: *Dr. Guillermo Bazan*

Mentors: *Janice Hong, Steve Dwight, & Brent Gaylord*

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Introduction

Biosensor Applications

- What is it?

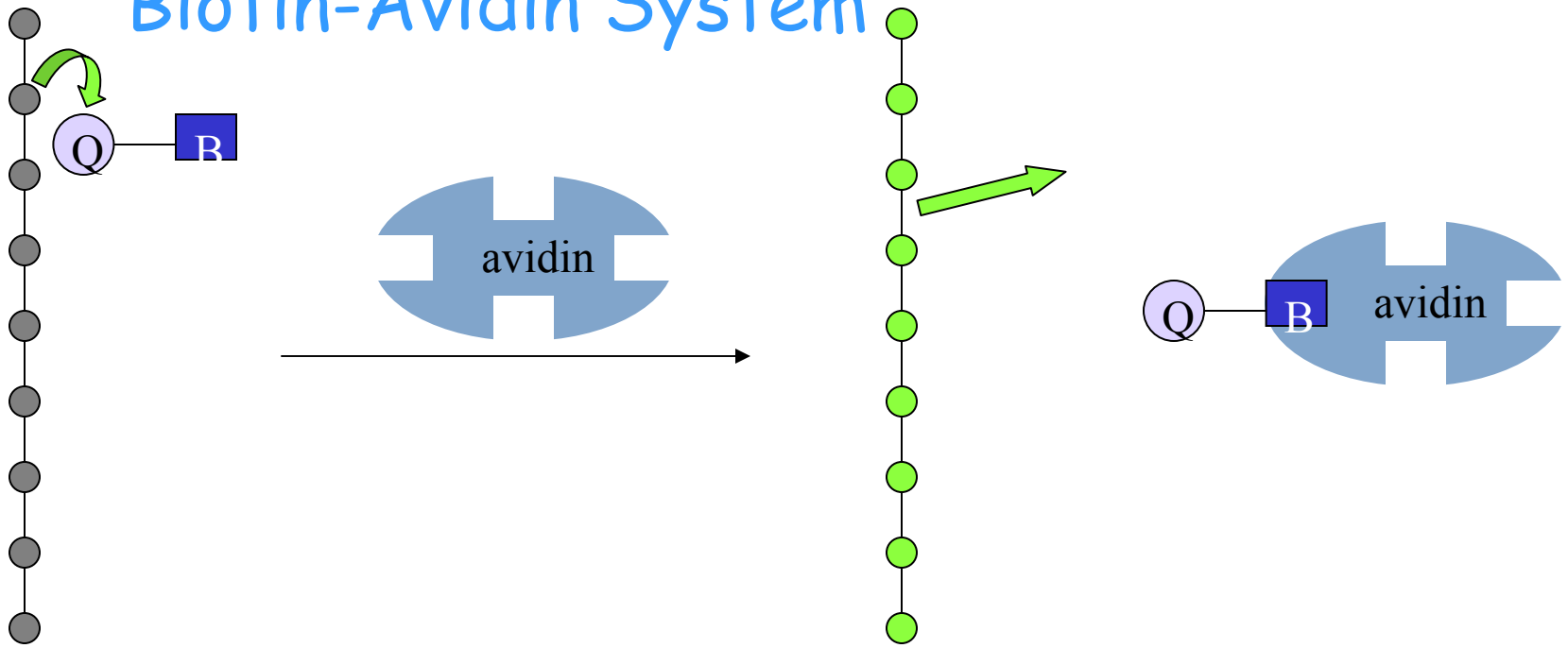
  A process used to detect the presence of specific chemical or biological molecules

- Why is it important?

  Uses include: bioterrorism, medical diagnostics, sterile environments and in various research applications

Introduction

Biotin-Avidin System



Fluorescence quenched

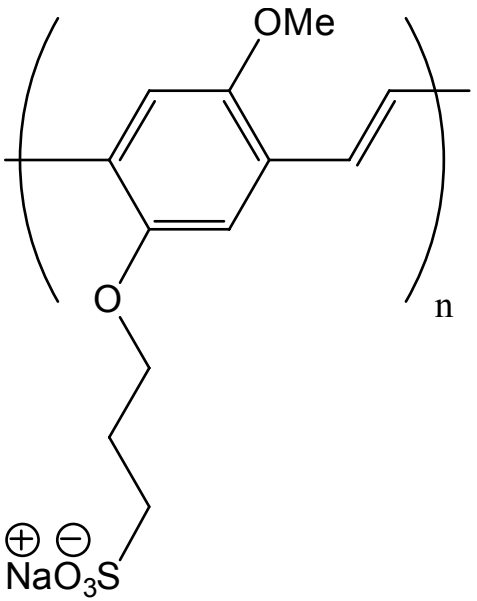
Strong fluorescence

L. Chen, S. Xu, D.W. McBranch, H. Wang, R. Hegelson, F. Wudl, D. G. Whitten, PNAS, 1999, 94, 12287.

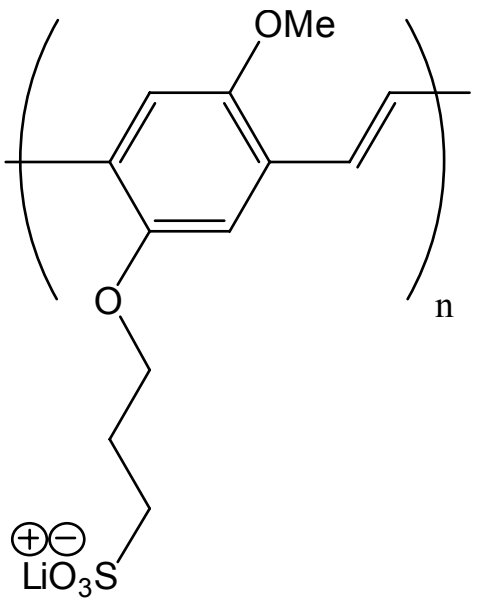
Introduction

Chromophores

MPS-PPV



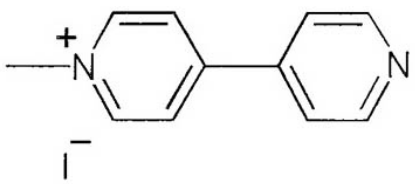
MPL-PPV



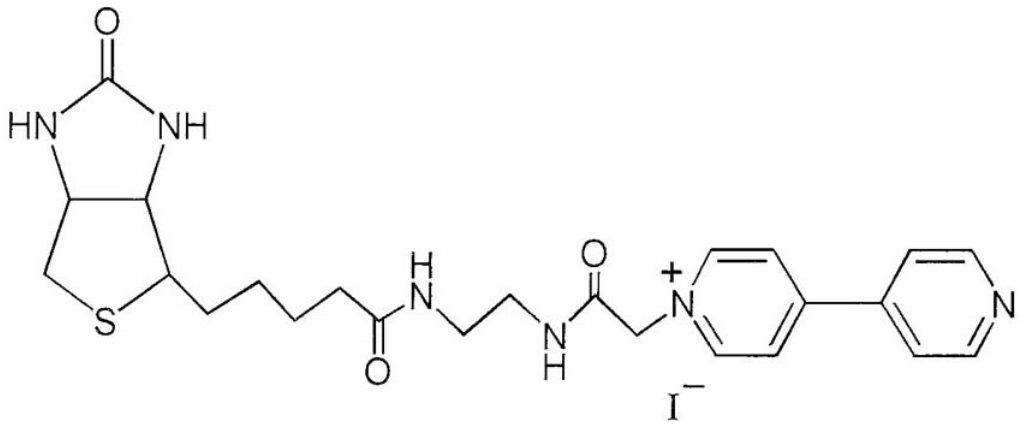
Introduction

Quenchers

Methyl-Viologen (Q)



Methyl-Viologen + Biotin (QTL)



Methods

Molecular Fingerprint

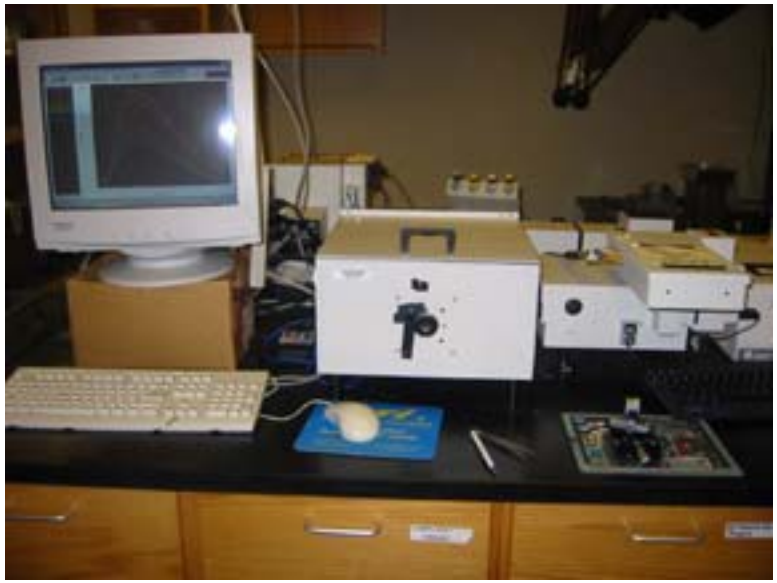
Fluorescent compounds have two characteristic spectra

1) Absorption spectrum

the λ & amt of light abs.

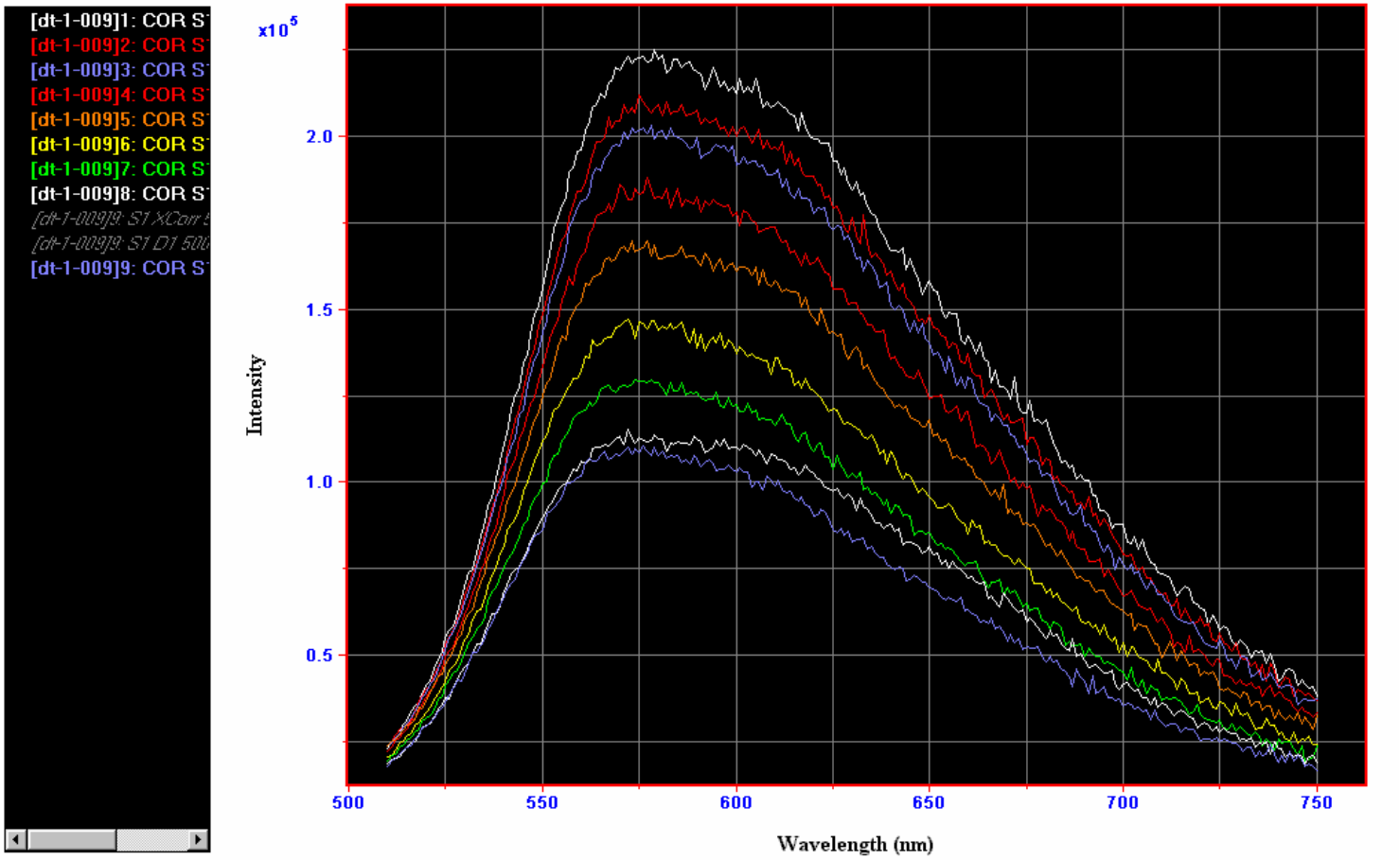
2) Emissions spectrum

the λ & amt. of light emitted



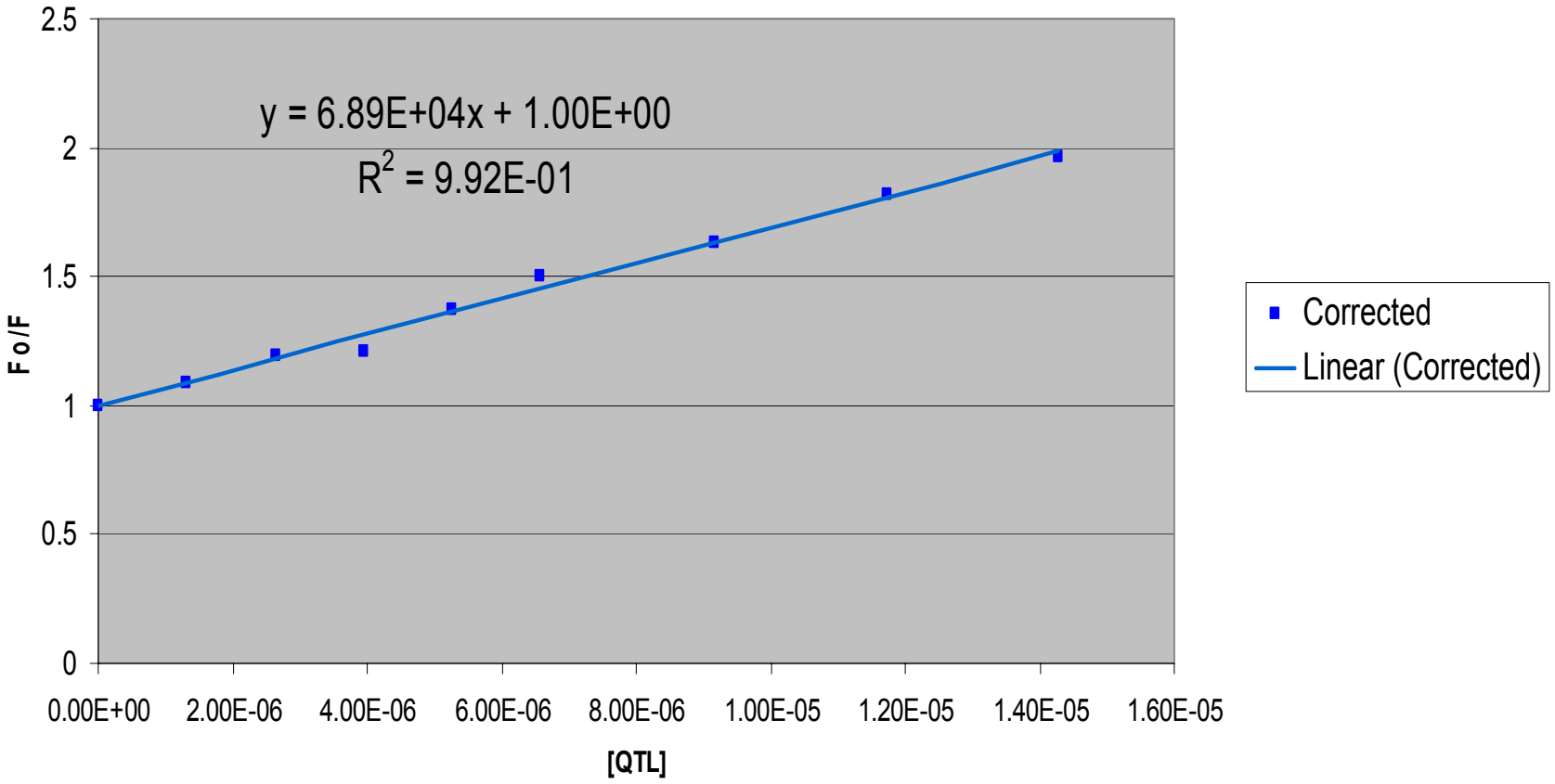
Methods

Fluorimeter



Results

MPS-PPV + QTL in Buffer



Results

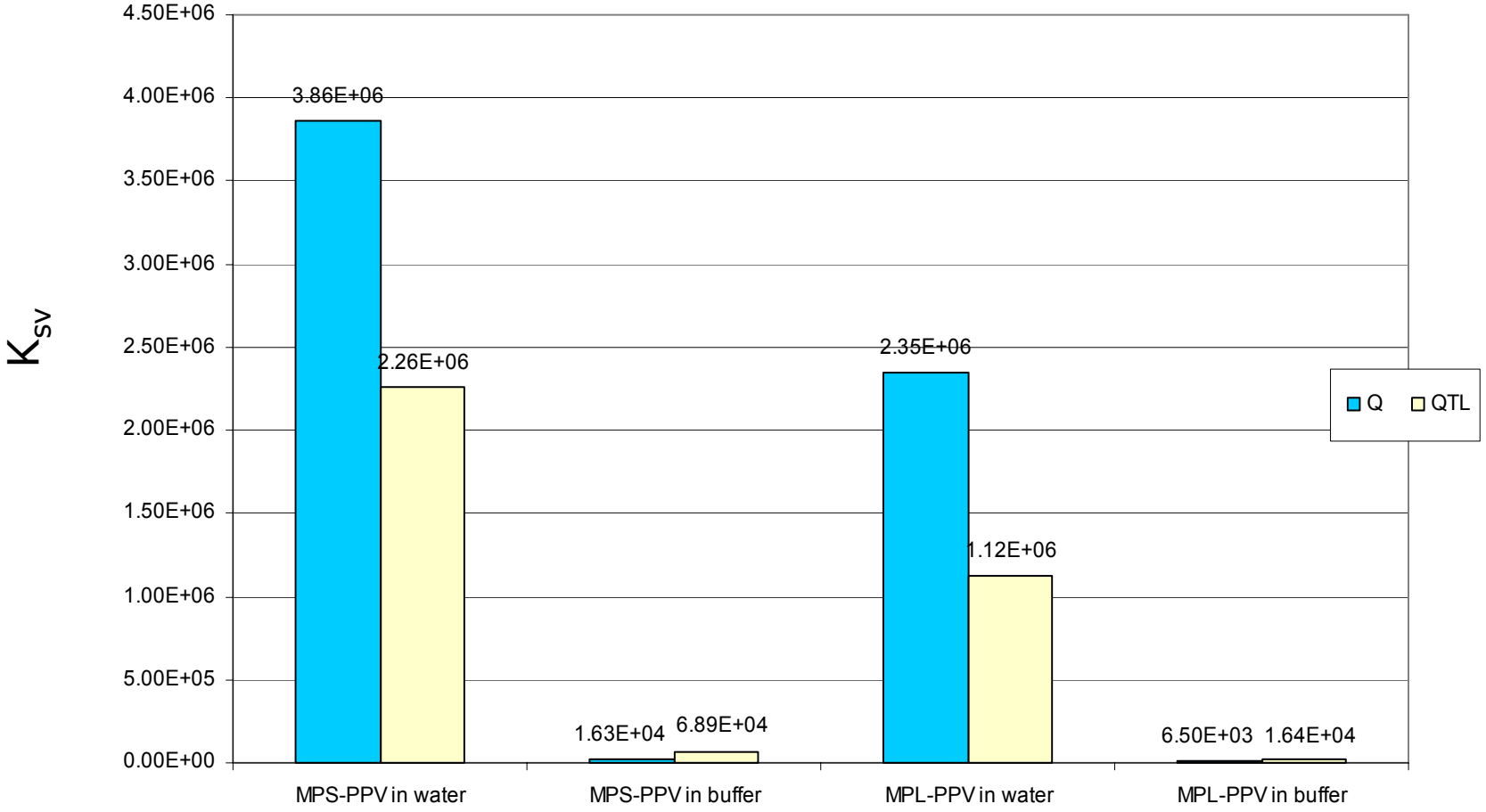
Quenching Rate Constant

(Corrected)

Chromophore	Solvent	Q	QTL
MPS-PPV	Water	3.86E+06	2.26E+06
	Buffer	1.63E+04	6.89E+04
MPL-PPV	Water	2.35E+06	1.12E+06
	Buffer	6.50E+03	1.64E+04

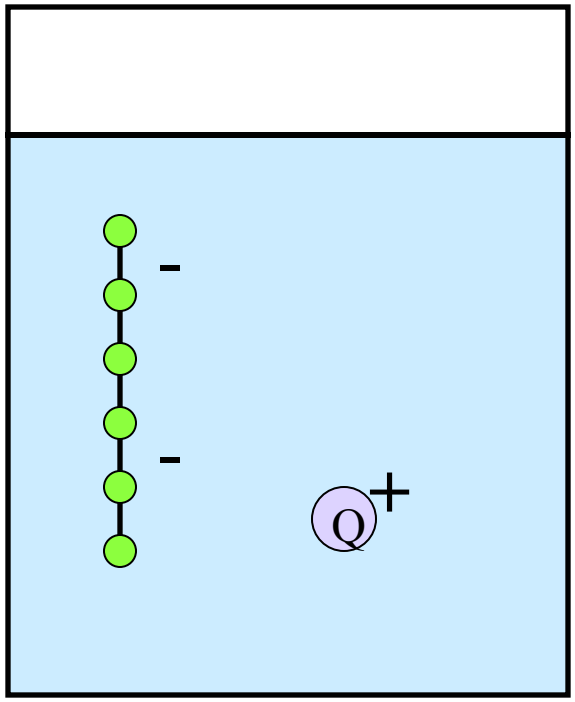
Analysis

Quenching Rate Constants

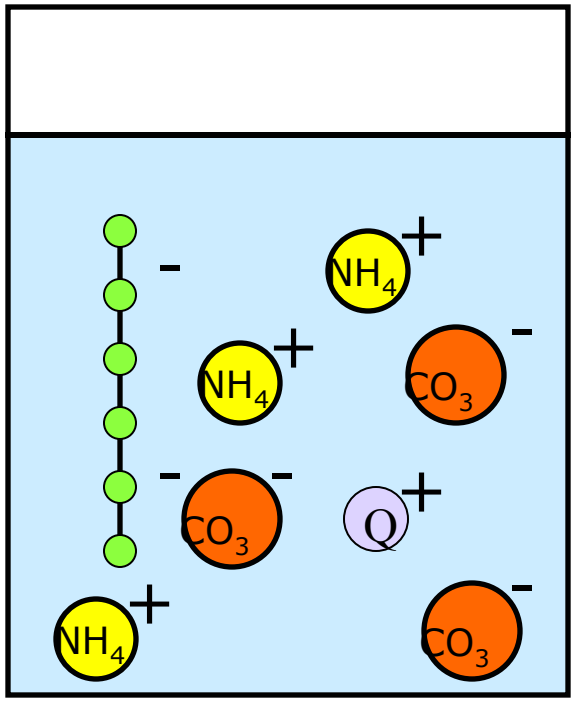


Analysis

Quencher Polymer Interaction



In Water



In Buffer

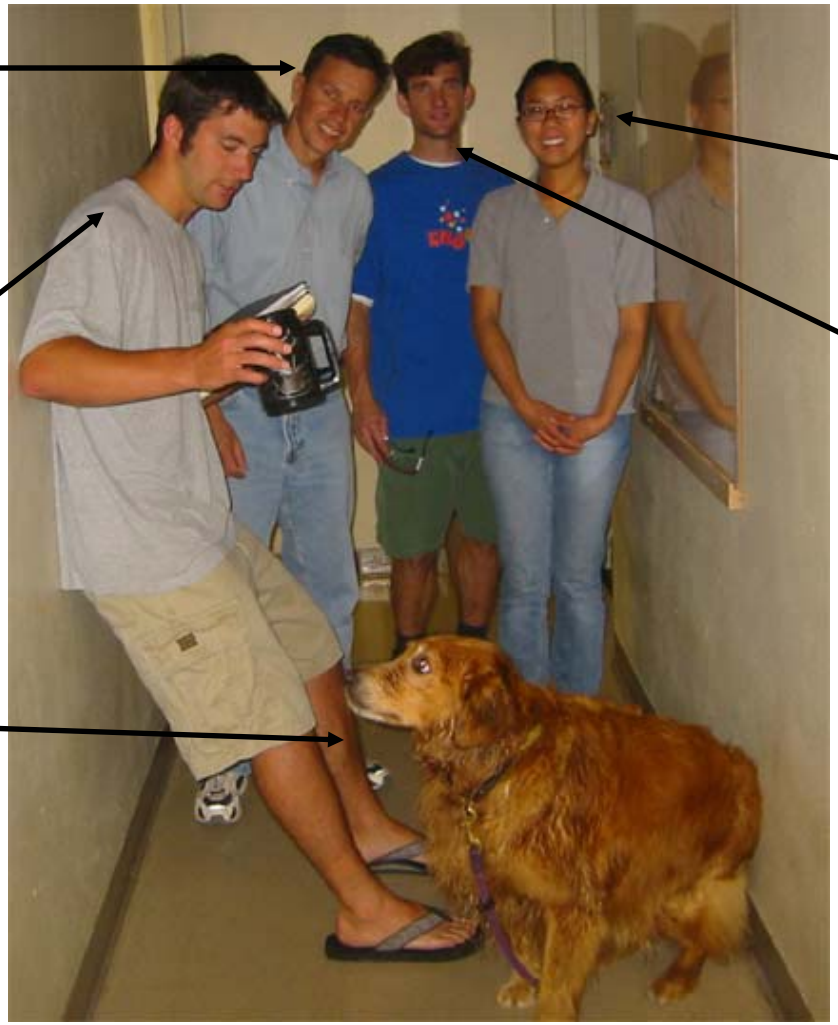
Conclusions

- An increase in ionic strength decreases the efficacy of fluorescent quenching

Further Research

- Synthesize new chromophores
- Measure K_{sv}'s for new chromophores in various environmental conditions

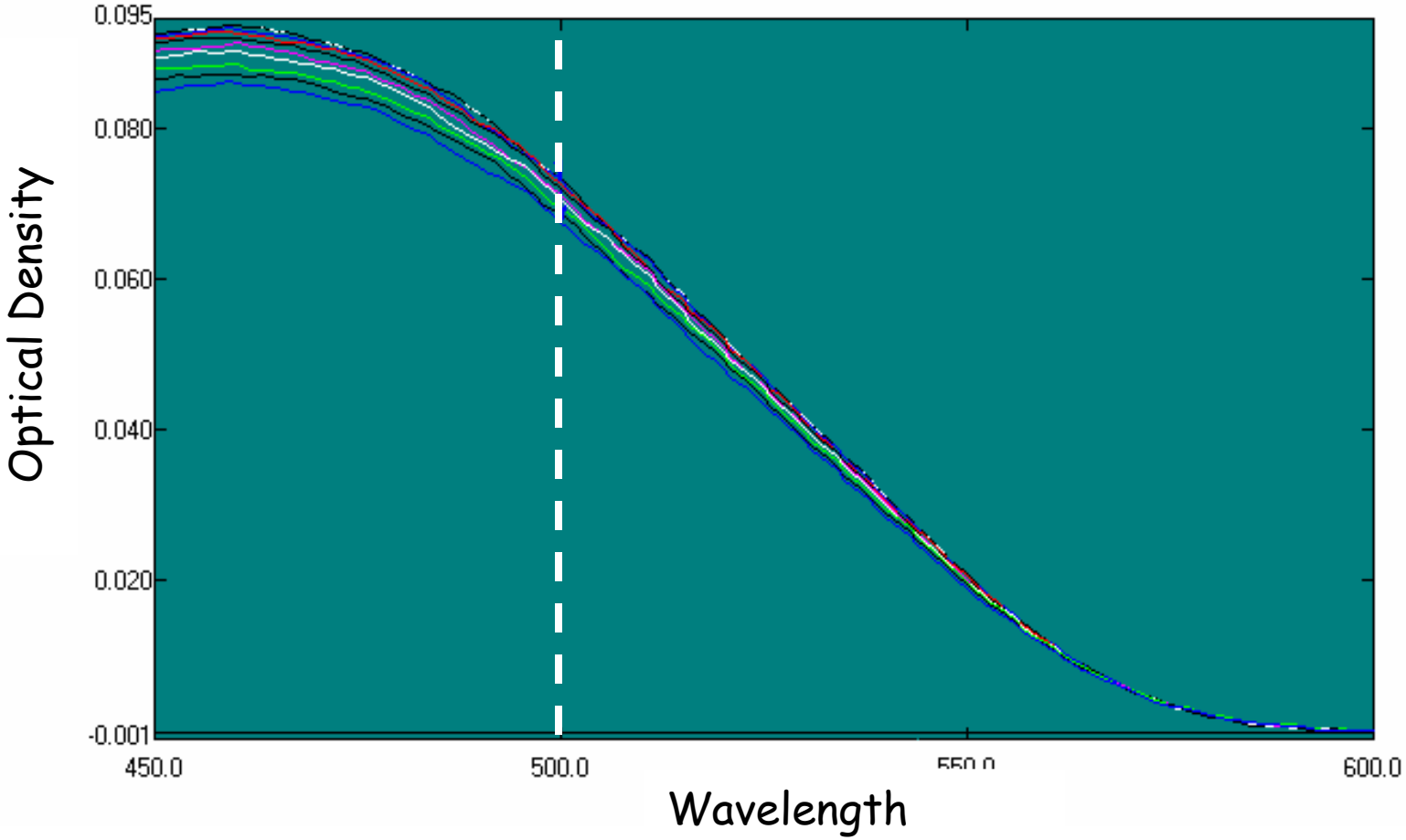
Acknowledgements



Thank You!!!

Methods

Spectrometer



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