Supplemental Figures

Figure 1S. Time evolution of the fluorescence emission spectra. (A) 15 μM dT_{12} with 90 μM Ag^+ and 90 μM BH_4^- in a pH = 10.5 buffer using λ_{ex} = 340 nm/λ_{em} = 540 nm. (B) 15 μM $dT_4C_4T_4$ with 90 μM Ag^+ and 90 μM BH_4^- in a pH = 10.5 buffer using λ_{ex} = 360 nm/λ_{em} = 475 nm.

Figure 2S. Dependence of the fluorescence intensity with the relative concentration of Ag^+:oligonucleotide for dT_{12} (A) and $dT_4C_4T_4$ (B). The concentrations of the oligonucleotides were 15 μM, and the pH of the buffer was 10.5. One equivalent of BH_4^- was used for one equivalent of Ag^+. For dT_{12} and $dT_4C_4T_4$, λ_{ex} = 340 nm/λ_{em} = 540 nm and λ_{ex} = 360 nm/λ_{em} = 475 nm, respectively.

Figure 3S. Induced circular dichroism and absorption spectra for the electronic transitions of the cluster-oligonucleotide conjugates. The solid line (left axis) represents the circular dichroism spectrum, and the dashed line (right axis) represents the absorption spectrum. (A) 15 μM dT_{12} with 90 μM Ag^+ and 90 μM BH_4^-. (B) 15 μM $dT_4C_4T_4$ with 90 μM Ag^+ and 90 μM BH_4^-.

Figure 4S: Fluorescence intensity (circles) of the λ_{ex} = 340 nm/λ_{em} = 540 nm fluorescence species and the absorbance (crosses) at 430 nm as a function of time for a sample with 6 Ag^+:dT_{12} in a buffer with pH = 10.5. The data sets were fitted using single exponential functions. The rate is 0.004 /s for the fluorescence, and the rate is 0.005 /s for the absorbance.

Figure 5S. Absorption spectrum of 15 μM dT_{12} with 90 μM Ag^+ and 90 μM BH_4^- in a pH = 10.5 buffer. The dotted line represents the spectrum in a nitrogen saturated sample while the solid line represents the spectrum in an oxygen saturated sample.

Figure 6S. Fluorescence spectrum were collected using λ_{ex} = 340 nm for a sample with 15 μM dT_{12} with 90 μM Ag^+ and 90 μM BH_4^- in a pH = 10.5 buffer. The dotted line represents the spectrum in the air saturated sample while the solid line represents the spectrum in the O_2 saturated sample.

Figure 7S. Fluorescence spectra in solutions saturated with nitrogen (dashed line) and in same nitrogen-saturated solutions that were subsequently saturated with oxygen (solid line). The conditions were 15 μM $dT_4C_4T_4$ with 90 μM Ag^+ and 90 μM BH_4^- in a pH = 10.5 buffer.

Figure 8S: Fluorescence quantum yield measurements for the cluster-$dT_4C_4T_4$ conjugates. Using λ_{ex} = 370 nm, the fluorescence intensity at 475 nm is plotted as a function of the absorbance at 370 nm. The sample has 6 Ag^+:$dT_4C_4T_4$ in a pH = 10.5 buffer. The slopes are 4.2 (± 0.1) x 10^7 c/s (intercept = 70000 +/- 14000) for quinine and 1.1 (± 0.1) x 10^7 c/s (intercept = 35000 +/- 140000) for the silver clusters.

Figure 9S. Fluorescence emission intensities as a function of the excitation power for a 10X diluted sample of 15 μM $dT_4C_4T_4$ with 90 μM Ag^+ and 90 μM BH_4^- in a pH = 10.5 buffer. The 30 μW power used for these studies is indicated by the vertical line.

Figure 10S. (A) A composite fluorescence spectrum of 0.5 μM $dC_4T_4C_4$ with 90 μM Ag^+ and 90 μM BH_4^- in water. The emission wavelengths are on the bottom axis and the excitation wavelengths are on the right axis. The spectra were acquired 16 hrs after adding BH_4^-. (B) Fluorescence spectra in solutions saturated with nitrogen (dashed line) and in same nitrogen-saturated solutions that were subsequently saturated with oxygen (solid line). (C) Fluorescence intensities of the λ_{ex} = 340 nm/λ_{em} = 495 nm band as a function of pH.

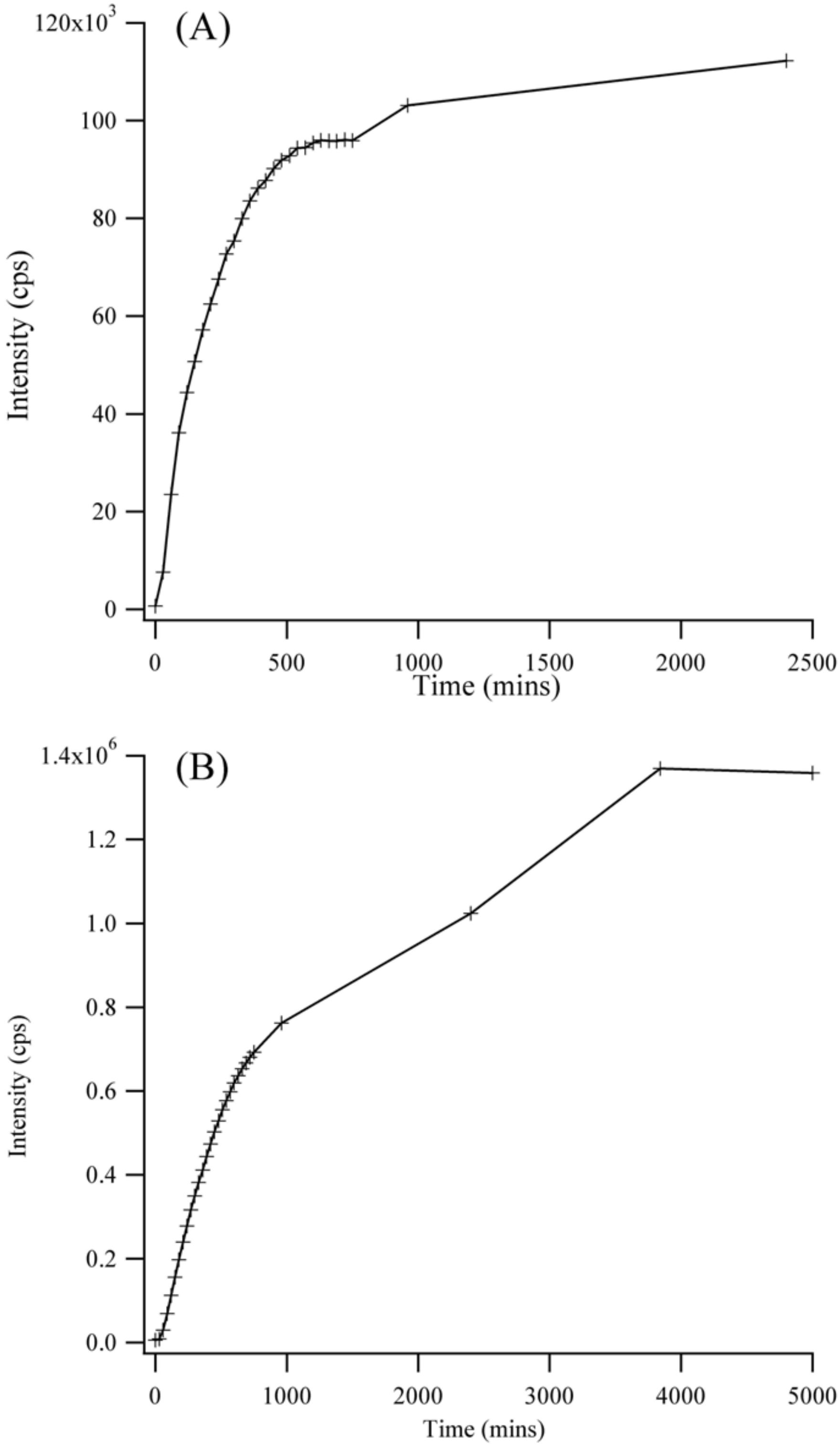

(A)
120x10^3
100
80
60
40
20
0
Intensity (cps)
0
500
1000
1500
2000
2500
Time (mins)
(B)
1.4x10^6
1.2
1.0
0.8
0.6
0.4
0.2
0.0
Intensity (cps)
0
1000
2000
3000
4000
5000
Time (mins)

Figure 1S

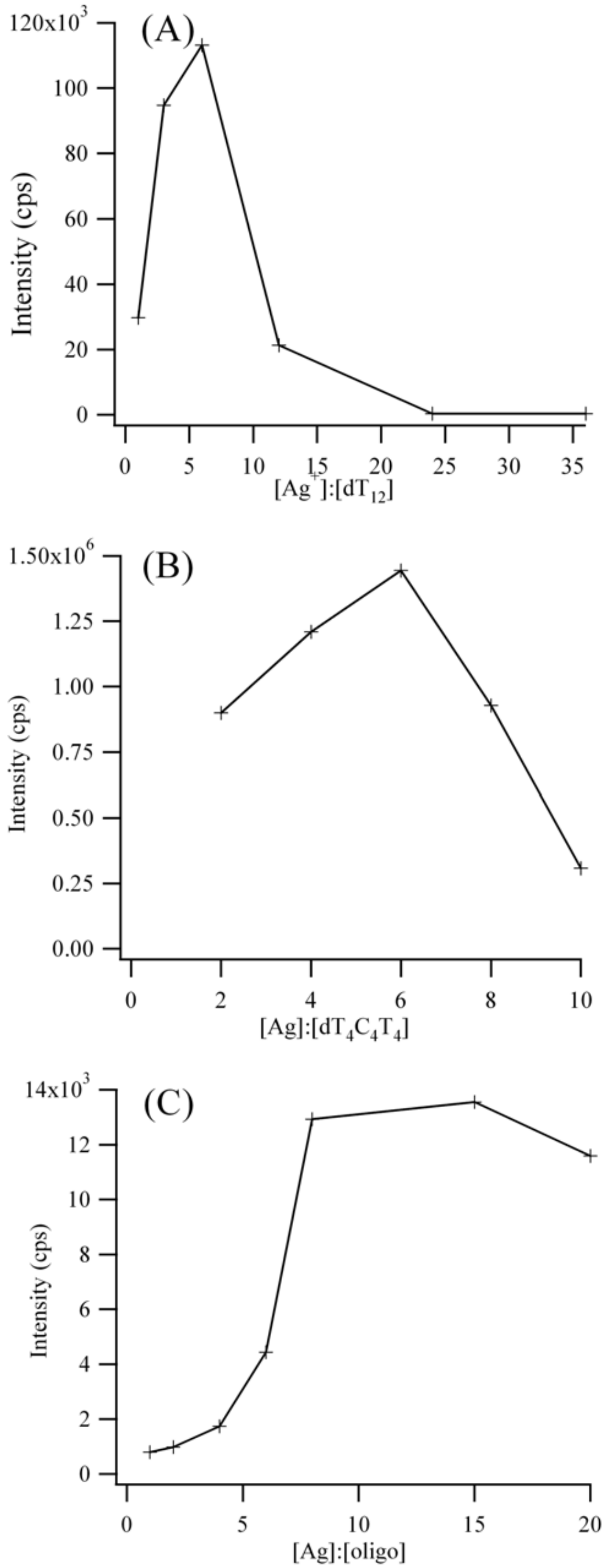
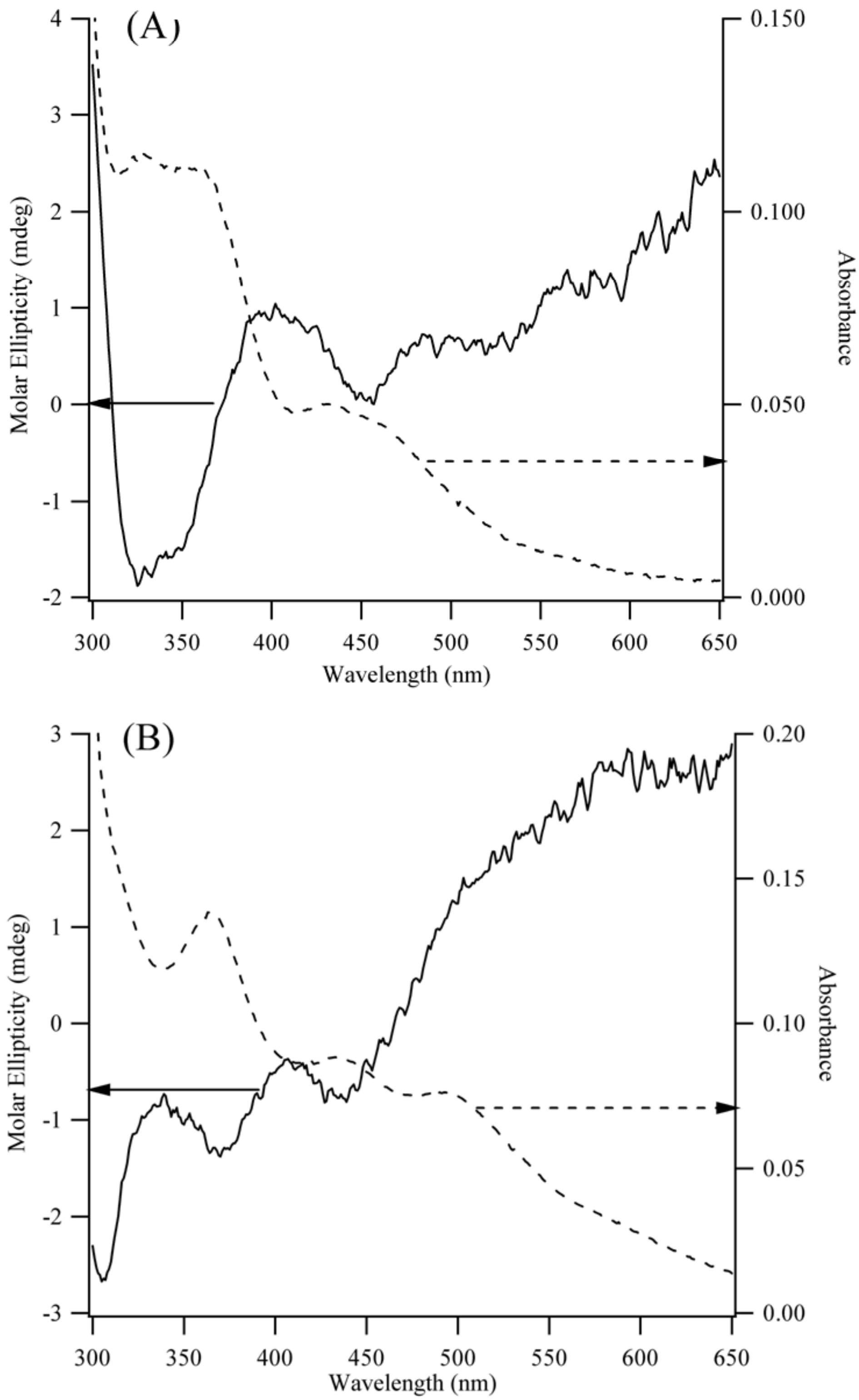
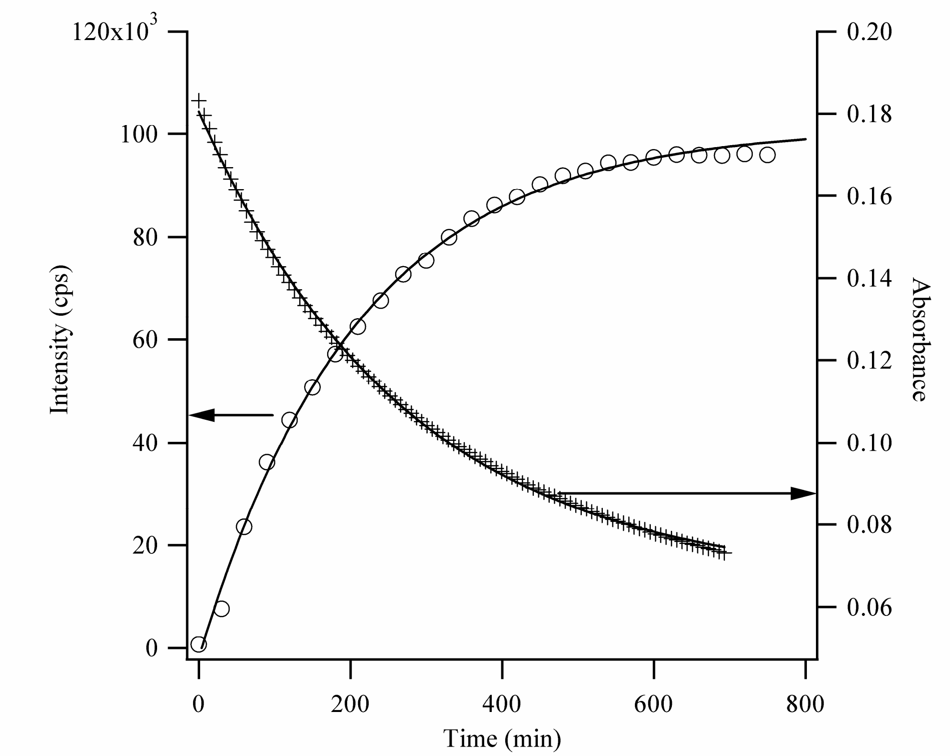

(A)
120x10^3
100
80
60
40
20
0
Intensity (cps)
0 5 10 15 20 25 30 35
[Ag+]:[dT12]
(B)
1.50x10^6
1.25
1.00
0.75
0.50
0.25
0.00
Intensity (cps)
0 2 4 6 8 10
[Ag]:[dT4C4T4]
(C)
14x10^3
12
10
8
6
4
2
0
Intensity (cps)
0 5 10 15 20
[Ag]:[oligo]

Figure 2S



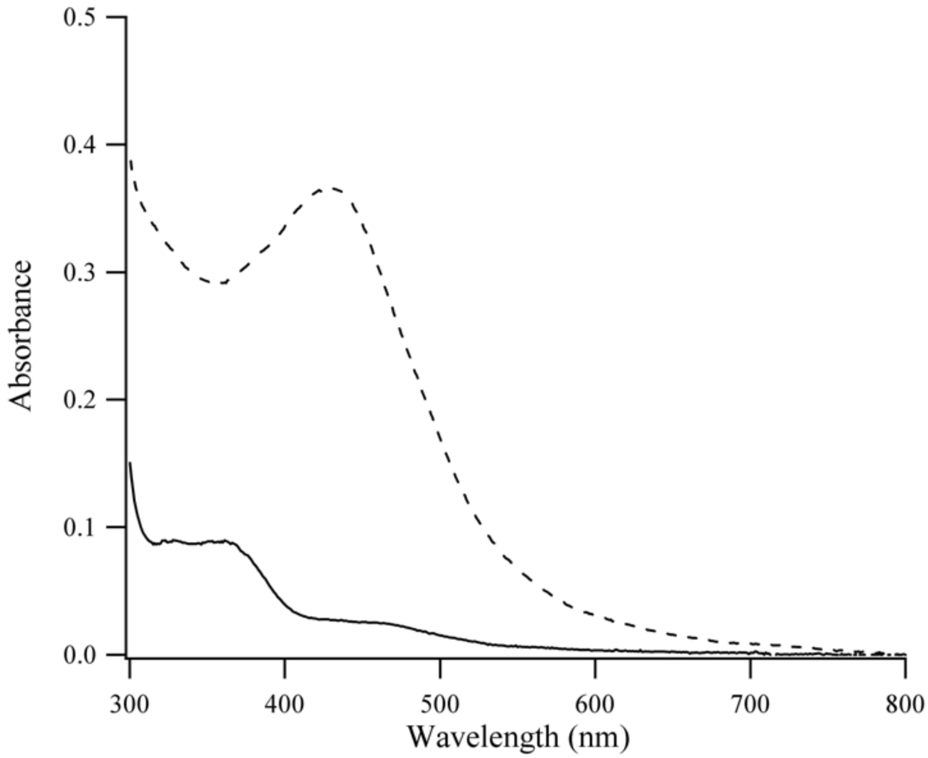
(A)
Molar Ellipticity (mdeg)
Absorbance
Wavelength (nm)
4
3
2
1
0
-1
-2
0.150
0.100
0.050
0.000
300
350
400
450
500
550
600
650
(B)
Molar Ellipticity (mdeg)
Absorbance
Wavelength (nm)
3
2
1
0
-1
-2
-3
0.20
0.15
0.10
0.05
0.00
300
350
400
450
500
550
600
650

Figure 3S



120x10^3
100
80
60
40
20
0
Intensity (cps)
0.20
0.18
0.16
0.14
0.12
0.10
0.08
0.06
Absorbance
0
200
400
600
800
Time (min)

Figure 4S



0.5
0.4
0.3
0.2
0.1
0.0
Absorbance
300
400
500
600
700
800
Wavelength (nm)

Figure 5S

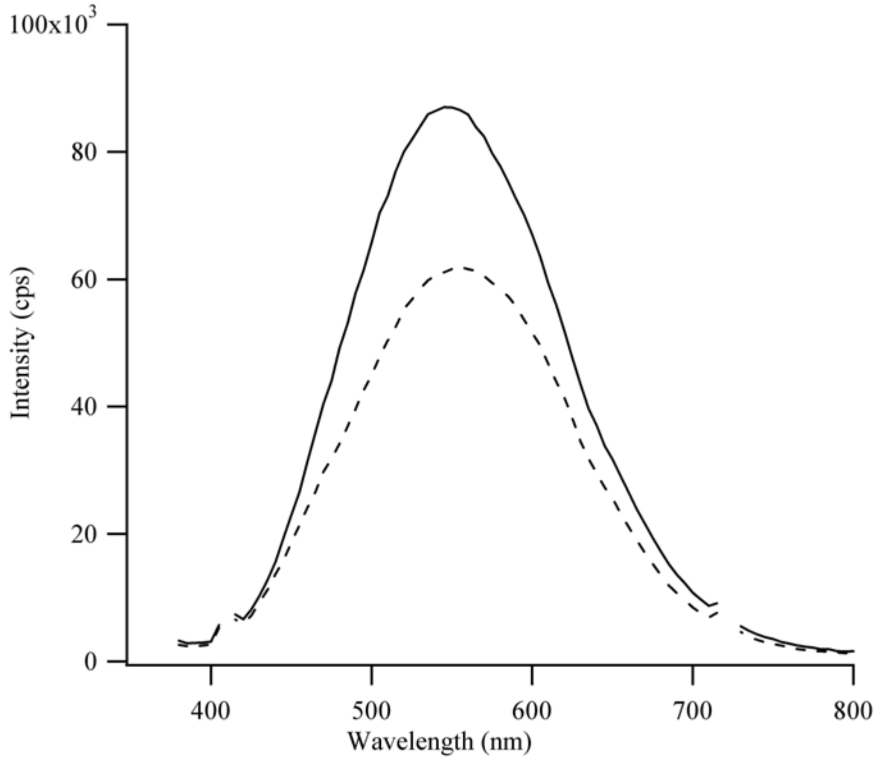
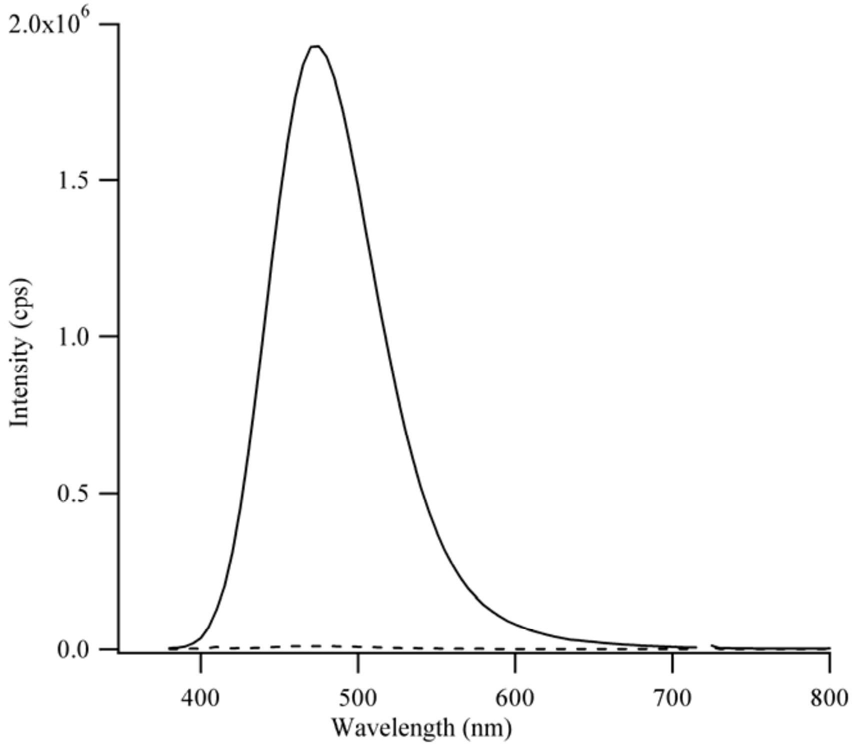
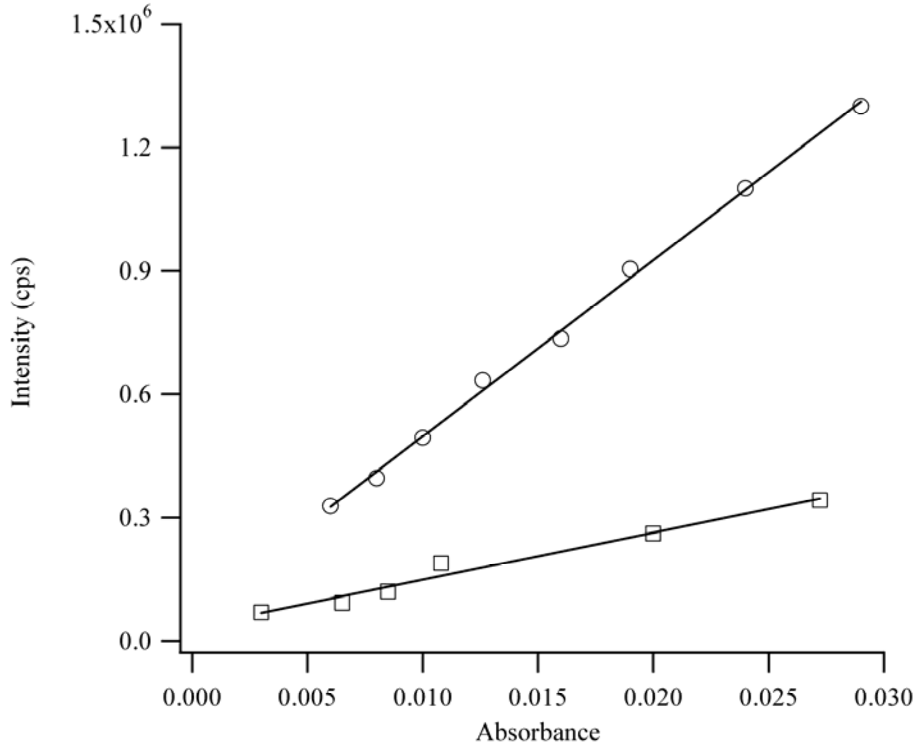

100x10^3
80
60
40
20
0
Intensity (cps)
400
500
600
700
800
Wavelength (nm)

Figure 6S


2.0x10^6
1.5
1.0
0.5
0.0
Intensity (cps)
400
500
600
700
800
Wavelength (nm)

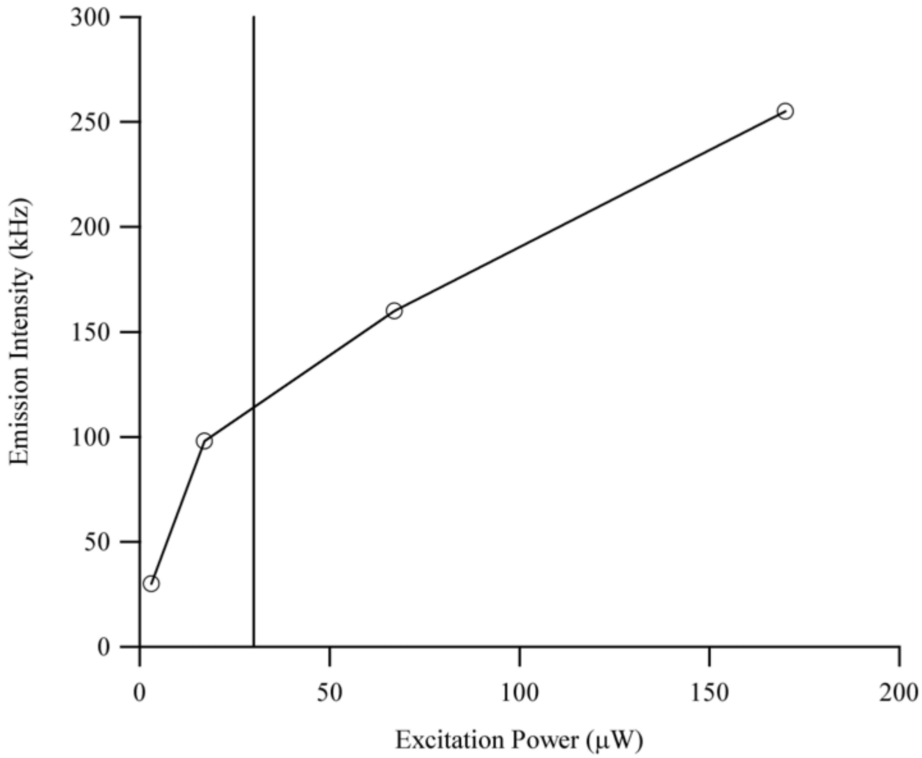
.

Figure 7S



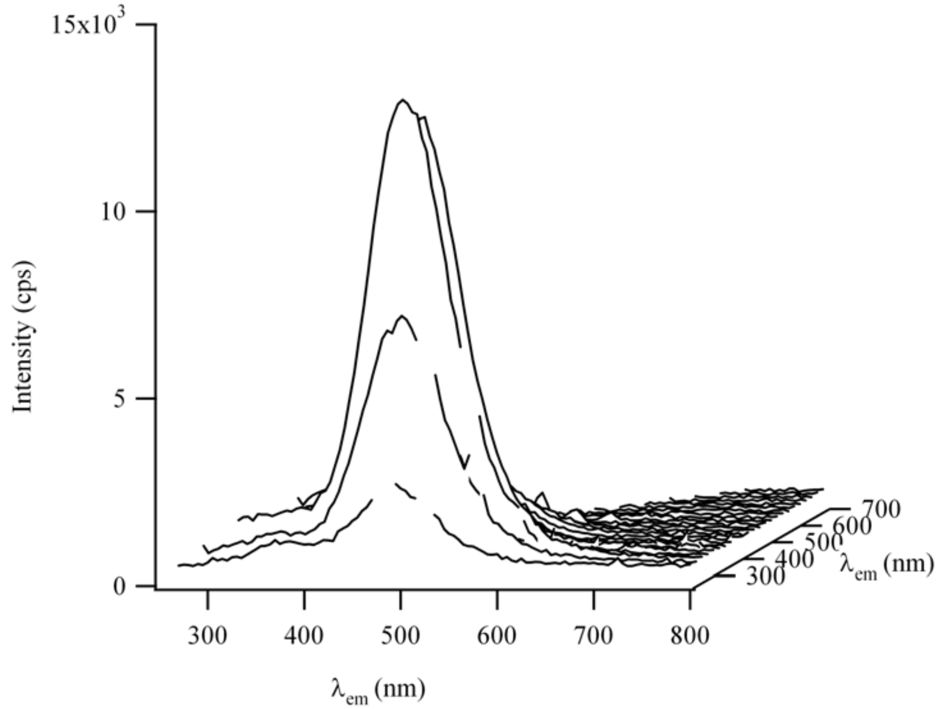
1.5x10^6
1.2
0.9
0.6
0.3
0.0
Intensity (cps)
0.000
0.005
0.010
0.015
0.020
0.025
0.030
Absorbance

Figure 8S

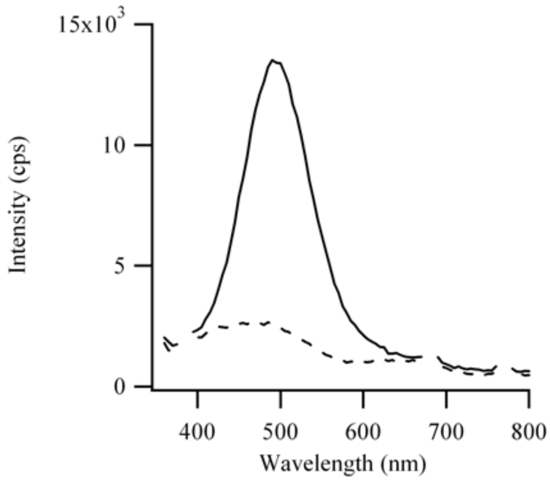


300
250
200
150
100
50
0
Emission Intensity (kHz)
0
50
100
150
200
Excitation Power (μW)

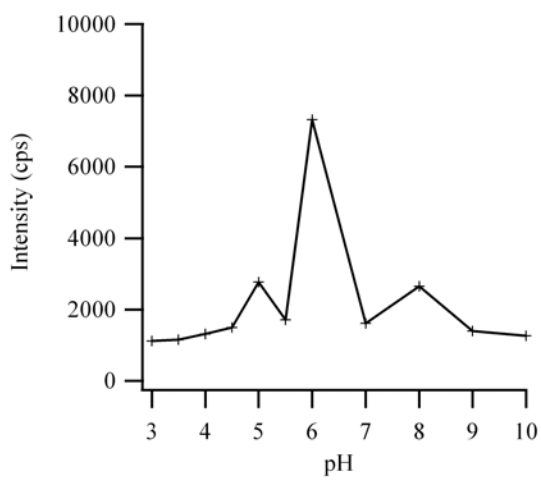
Figure 9S



15x10³
10
5
0
Intensity (cps)
300
400
500
600
700
800
λem (nm)
700
600
500
400
300
λem (nm)



15x10³
10
5
0
Intensity (cps)
400
500
600
700
800
Wavelength (nm)



10000
8000
6000
4000
2000
0
Intensity (cps)
3
4
5
6
7
8
9
10
pH

Figure 10S