Supporting Information
for

Water-Soluble Sulfonate Schiff-Base Ligands as Fluorescent Detectors for Metal Ions in Drinking Water and Biological Systems

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Quenching Spectrum for L₁
Abundance vs Wavelength (nm) for different metal compounds:

- **Cobalt Acetate**
  - Control
  - 0.10 equiv
  - 0.25 equiv
  - 0.50 equiv
  - 0.75 equiv
  - 1.0 equiv
  - 2.0 equiv
  - 4.0 equiv

- **Cobalt Chloride**
  - Control
  - 0.10 equiv
  - 0.25 equiv
  - 0.50 equiv
  - 0.75 equiv
  - 1.0 equiv
  - 2.0 equiv
  - 4.0 equiv

- **Cobalt Nitrate**
  - Control
  - 0.10 equiv
  - 0.25 equiv
  - 0.50 equiv
  - 0.75 equiv
  - 1.0 equiv
  - 2.0 equiv
  - 4.0 equiv

- **Lead Nitrate**
  - Control
  - 0.10 equiv
  - 0.25 equiv
  - 0.50 equiv
  - 0.75 equiv
  - 1.0 equiv
  - 2.0 equiv
  - 4.0 equiv

- **Cadmium Nitrate**
  - Control
  - 0.10 equiv
  - 0.25 equiv
  - 0.50 equiv
  - 0.75 equiv
  - 1.0 equiv
  - 2.0 equiv
  - 4.0 equiv

- **Sodium Arsenate**
  - Control
  - 0.10 equiv
  - 0.25 equiv
  - 0.50 equiv
  - 0.75 equiv
  - 1.0 equiv
  - 2.0 equiv
  - 4.0 equiv

- **Silver Nitrate**
  - Control
  - 0.10 equiv
  - 0.25 equiv
  - 0.50 equiv
  - 0.75 equiv
  - 1.0 equiv
  - 2.0 equiv
  - 4.0 equiv
Quenching Spectrum for L2

**Copper Acetate**

![Graph of Copper Acetate](image1)

**Copper Chloride**

![Graph of Copper Chloride](image2)

**Copper Bromide**

![Graph of Copper Bromide](image3)

**Copper Nitrate**

![Graph of Copper Nitrate](image4)

**Nickel Acetate**

![Graph of Nickel Acetate](image5)

**Nickel Sulfate**

![Graph of Nickel Sulfate](image6)

**Chromium Acetate**

![Graph of Chromium Acetate](image7)

**Chromium Chloride**

![Graph of Chromium Chloride](image8)

**Chromium Nitrate**

![Graph of Chromium Nitrate](image9)
Quenching Spectrum for L₃

Copper Acetate

Copper Bromide

Cobalt Chloride

Copper Nitrate

Nickel Acetate

Nickel Sulfate

Chromium Chloride

Chromium Nitrate
Quenching Spectrum for L₄

Copper Acetate

Wavelength (nm)

Copper Bromide

Wavelength (nm)

Copper Chloride

Wavelength (nm)

Copper Nitrate

Wavelength (nm)

Nickel Acetate

Wavelength (nm)

Nickel Sulfate

Wavelength (nm)

Chromium Chloride

Wavelength (nm)

Chromium Nitrate

Wavelength (nm)
**Figure S3**: Fluorescence quenching graphs of L₁ (10 µM) and L₂-₄ (1 mM) in deionized water upon addition of 1.0 equiv. of varying counterions.
**Figure S4**: Ionic strength studies were performed with all L$_1$ (10 µM) and L$_{2-4}$ (1 mM) in the presence of 1000 mM, 100 mM, 10 mM and 1 mM solutions of NaCl, Na$_2$SO$_4$, MgCl$_2$ and MgSO$_4$. For L$_1$, salt concentrations at 1000 mM were not reproducible and thus omitted from the spectrum.

**Sodium Chloride**

![Graphs showing fluorescence intensity vs. wavelength for L$_1$, L$_2$, L$_3$, and L$_4$ under different NaCl concentrations.](image)
Magnesium Chloride

$\mathbf{L_1}$

$\begin{align*}
\text{Fluorescence Intensity} \\
\text{350} & \text{400} & \text{450} & \text{500} & \text{550} \\
\end{align*}$

$\mathbf{L_2}$

$\begin{align*}
\text{Fluorescence Intensity} \\
\text{420} & \text{470} & \text{520} & \text{570} & \text{620} \\
\end{align*}$

$\mathbf{L_3}$

$\begin{align*}
\text{Fluorescence Intensity} \\
\text{400} & \text{450} & \text{500} & \text{550} & \text{600} \\
\end{align*}$

$\mathbf{L_4}$

$\begin{align*}
\text{Fluorescence Intensity} \\
\text{400} & \text{450} & \text{500} & \text{550} & \text{600} \\
\end{align*}$
Magnesium Sulfate

Graphs showing fluorescence intensity against wavelength for different concentrations of magnesium sulfate.
**Figure S5:** Quenching spectra of L$_2$ (1mM) with increasing equivalence of Cu$^{2+}$ in the a) presence of 1000 mM MgSO$_4$ and b) in the absence of 1000 mM MgSO$_4$.

**Figure S6:** Competing metal ions Cu$^{2+}$ and Cr$^{3+}$ with L$_1$. The spectrum shows L$_1$ in the absence and presence of 1 equivalent of Cu$^{2+}$, 1 equivalent of Cr$^{3+}$ and 1 equivalent of Cu$^{2+}$ and Cr$^{3+}$. UV-vis and daylight photos of the compounds are shown.
**Figure S7:** Detection Limit of L₁-L₄. L₁ was excited at 300 nm, L₂ was excited at 380 nm and L₃ and L₄ were excited at 375 nm.

**L₁**

![Graph for L₁](image1)

**L₂**

![Graph for L₂](image2)

**L₃**

![Graph for L₃](image3)
$y = 0.0041x - 0.0029$

$R^2 = 0.9824$
Figure S8: Absorbance spectrum of L₁-₄ at different pH in 10 mM KH₂PO₄ buffer.
Figure S9: Plot of the integrated fluorescence intensity for the emission of L₁-L₄ in the absence (orange bar) and presence (gray, yellow and blue bar) of 1 equivalent of the metal ion against pH. L₁ was excited at 300 nm and read from 350-600 nm; L₂ was excited at 380 nm and read from 420-600 nm; L₃ and L₄ were excited at 375 nm and read from 400-350 nm.
Figure S10: NMRs

NMR Precursor
