

Europium(III): Oxytetracycline Bioprobe in Coordination with L-Malate

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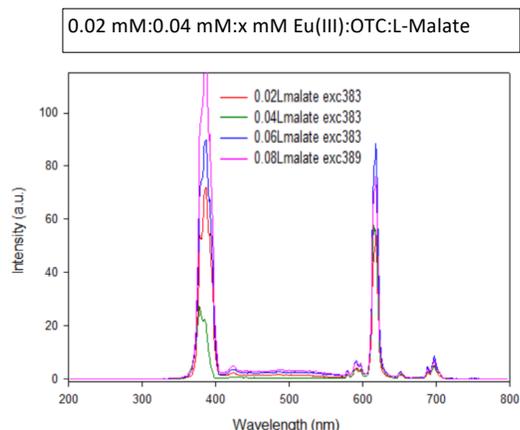
Abstract

Current exploration of luminescent lanthanide(III) complexes is fueled by the interest of applications to life sciences including chemical sensors and medical diagnosis and therapy.¹ Ln(III)s are used as bioprobes for their long-lived excited state. In our research group, we coordinated Eu(III) with oxytetracycline (OT), where the ligand, OT, surrounds the metal, Eu(III).² We studied how the Eu(III):OT complex interacts with the biological molecule L-malate. We wanted to find the best ratio of metal to ligand to act as an efficient bioprobe. The effectiveness of the Eu(III) luminescent bioprobe was measured by conducting steady-state and time-resolved luminescence measurements.

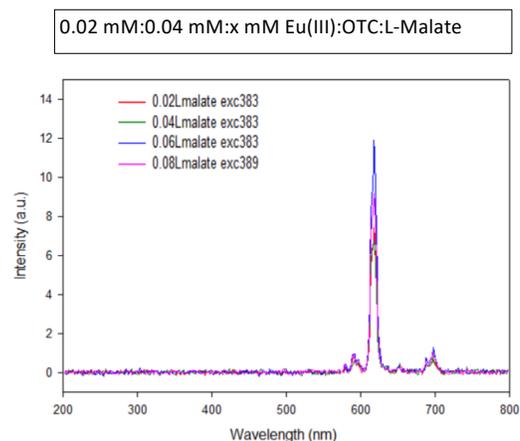
Project Activities and Findings

- Aqueous Eu(III)-OT samples were made with varying ratios of Eu(III), OT, and L-malate at pH 8.
- The concentration of Eu(III) and OT remained the same in each sample while the concentration of L-malate was increased by 0.2 mM.
- Steady-state and time-resolved luminescence measurements were taken for each sample.
- Eu(III):OT:L-malate complex emits the most intensive luminescence at a ratio of 1:2:3
- 3 eq. of L-malate interact with 1 eq. of Eu(III):OT

Steady-state Luminescence Spectra of Eu(III):OT:L-Malate Sample



Steady-state Luminescence Spectra of Eu(III):OT:L-Malate Sample



Research Questions

1. Which metal to ligand ratio would provide the most effective bioprobe?
2. How does the addition of a chiral biomolecule affect the luminescence intensity?
3. Which Ln(III) complex to biomolecule ratio would provide the most effective bioprobe?

Citations

1. G. Muller, *In Luminescence of Lanthanide Ions in Coordination Compounds and Nanomaterials*, First Edition, Ed. A. de Bettencourt-Dias, John Wiley & Sons, Inc.: Chichester, United Kingdom, 2014, Chapter 3, pp. 77-124.
2. K. K. Deol, G. Muller, *ChemPlusChem*, **2019**, *12*, 1796-1804.