

Belmont University

Belmont Digital Repository

Science University Research Symposium
(SURS)

Special Events

Fall 11-11-2024

Protonation of Terbium Complexes as a Possible Chemical Sensor

Sean W. Murray

sean.murray@bruins.belmont.edu

Follow this and additional works at: <https://repository.belmont.edu/surs>

 Part of the [Physical Sciences and Mathematics Commons](#)

Recommended Citation

Murray, Sean W., "Protonation of Terbium Complexes as a Possible Chemical Sensor" (2024). *Science University Research Symposium (SURS)*. 204.

<https://repository.belmont.edu/surs/204>

This Poster Presentation is brought to you for free and open access by the Special Events at Belmont Digital Repository. It has been accepted for inclusion in Science University Research Symposium (SURS) by an authorized administrator of Belmont Digital Repository. For more information, please contact repository@belmont.edu.

Title: Protonation of Terbium Complexes as a Possible Chemical Sensor

Upon ultraviolet excitation, terbium(III)-ligand complexes exhibit strong yellow-green fluorescence in accordance with the antenna effect. Recent studies in our laboratory show remarkable quenching of the emission signature upon exposure of homoleptic complexes to water or mineral acids. The changes are completely reversible under mild conditions, suggesting possible applications as a chemical sensor. Following the synthesis of $[\text{Tb}(\text{pydm})_3](\text{NO}_3)_3$ (pydm = 2,6-pyridine dimethanol), the complex was titrated with HCl and the changing absorption spectra of the complex was monitored through ultraviolet-visible spectroscopy. Further, we have purified and characterized this product through $^1\text{H-NMR}$ and $^{13}\text{C-NMR}$. A deeper understanding of the reactions causing the quenching of the emission upon exposure to water will aid the intelligent design of chemical sensors.