



Biphenyl and Terphenyl Lactone pH-Driven

Molecular Switches

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Background

Molecular Switch

- Can exist in at least two forms exhibiting different properties
- Interconversion between states

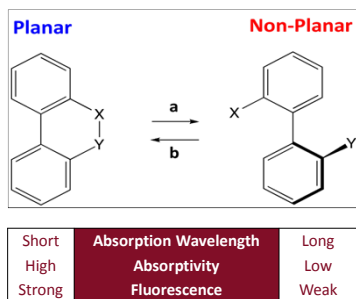
Switching Methods

- pH of environment
- Oxidation/Reduction

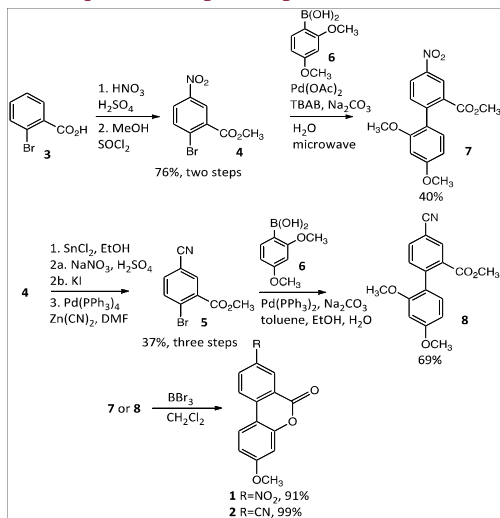


Two fundamental questions

1. Is there a measurable output for each state?
2. Can we reversibly switch between each state?

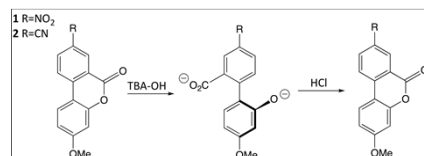


Biphenyl Synthesis

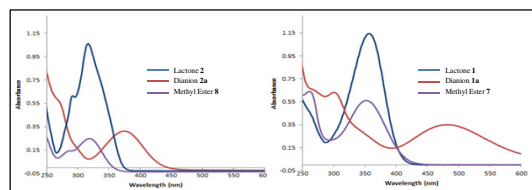


**Carlson, Erik J.; Riel, Asia Marie S.; Dahl, Bart J. *Tetrahedron Lett.*, 2012, 53, 6245 – 6249.

Switching Studies

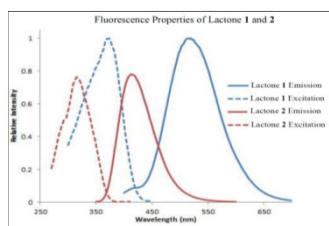


UV-Vis Studies

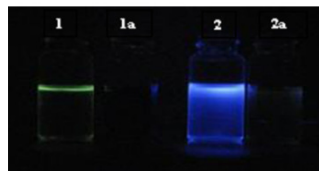


	Absorption Wavelength (nm)	Coefficient of Extinction (M ⁻¹ cm ⁻¹)
Nitro Lactone	356	172185
Nitro Dianion	481	58359
Nitro Methyl Ester	359	81846
Cyano Lactone	317	36686
Cyano Dianion	367	11482
Cyano Methyl Ester	319	8303

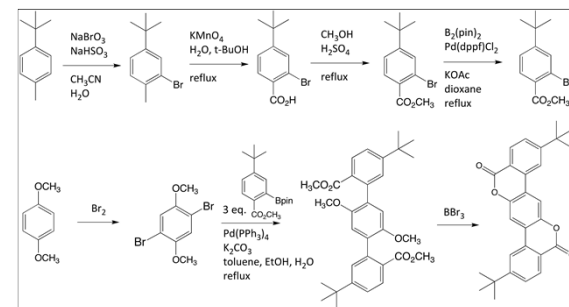
Fluorescence Studies



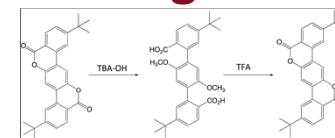
	Excitation	Emission
Nitro Lactone	370 nm	515 nm
Cyano Lactone	316 nm	420 nm



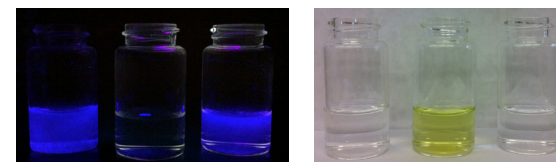
Terphenyl Synthesis



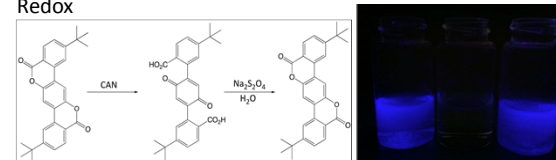
Switching Studies



pH

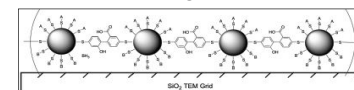


Redox



Future

- Condensation of molecule on to gold nanoparticles
- Alternate means of switching



Acknowledgments

- University of Wisconsin-Eau Claire Chemistry Department and Materials Science Center
- Department of Education Ronald E. McNair Program
- University of Wisconsin-Eau Claire Office of Research and Sponsored Programs
- American Chemical Society Petroleum Research Fund
- Learning and Technology Services at UWEC

