



# Synthesis and Study of Monodispersed Oligophenyl Lactones

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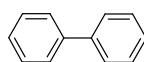
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## Objective

The goal of this project is to create and study different oligophenyl lactones that vary in both shape and size (fig 1). We are interested in these compounds because they should prove to be useful in applications such as solar cells, light emitting diodes, and semiconductors in thin film transistors. Our approach is to solve two problems associated with polyphenylenes. The first is an unfavorable dihedral angle between each phenyl group (fig. 2). The lowest energy

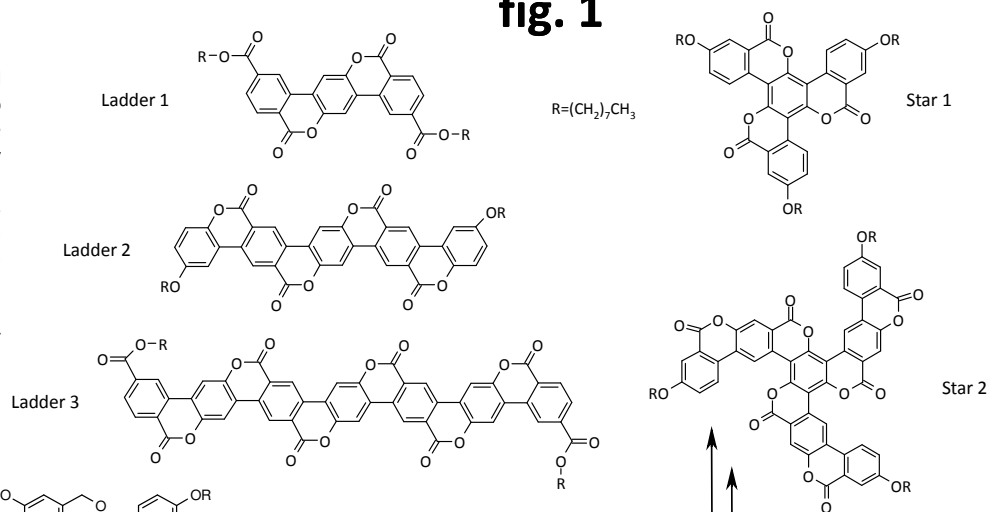
Biphenyl fig. 2 conformation of biphenyl is 30-40°.



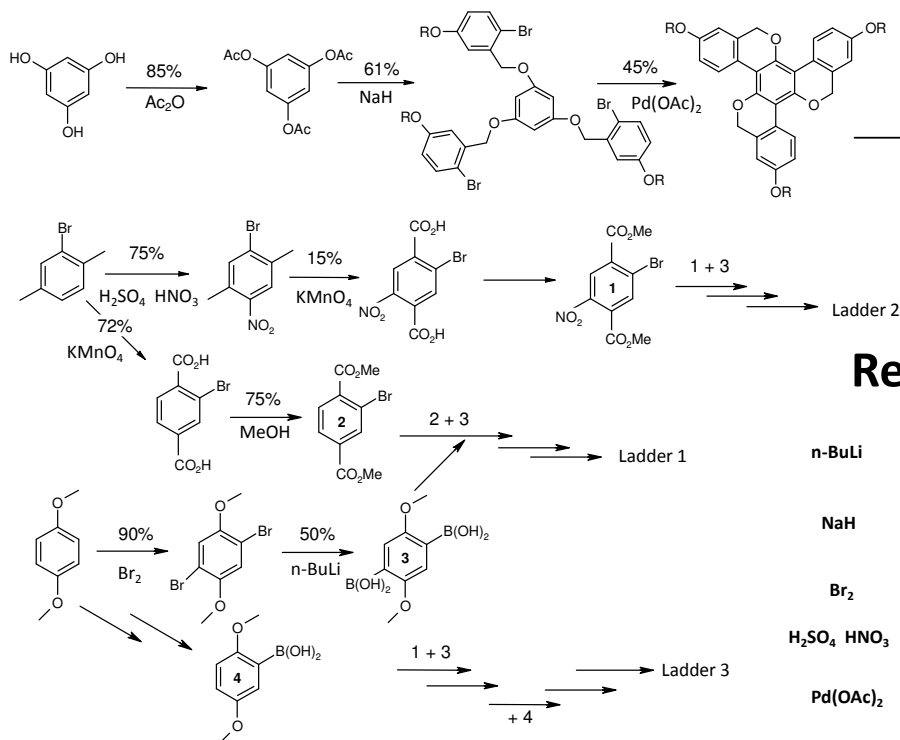
The twist between phenyl groups keeps electrons from moving easily from one end of the molecule to the other. The second and more difficult problem is poor solubility due to strong  $\pi$  stacking. This model suggests that longer oligophenyl lactones will be useful for absorption, and emission of longer wavelength light. Conversely the shorter molecules will absorb, and emit shorter wavelengths.

## Compounds of Interest

fig. 1

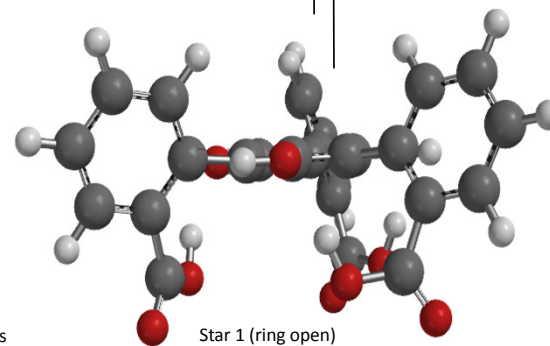


## Synthesis



## Reagents

- n-BuLi** Super base that is pyrophoric and must be handled under an inert atmosphere
- NaH** Pyrophoric base similar to sodium metal
- Br<sub>2</sub>** Corrosive
- H<sub>2</sub>SO<sub>4</sub> HNO<sub>3</sub>** Corrosive acid mixture
- Pd(OAc)<sub>2</sub>** Air sensitive catalyst



Star 1 (ring open) chelation center

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