Synthesis and Comparision of monophenyl and biphenyl 6-aryldibenzo[b,d]pyrylium salts

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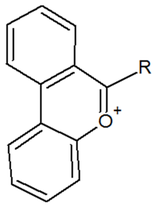
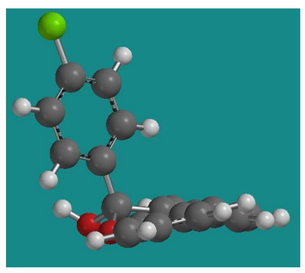
Objective

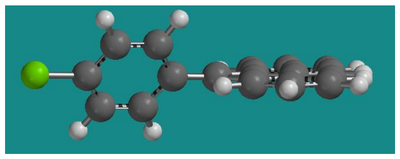
- Our objective is to synthesize different 6-aryldibenzo [b,d]pyrylium salts



  - By varying the R groups, we examine the communication between electron donors and acceptors across extended ring systems.

- To examine how pyrylium salts' spectroscopic properties change depending on pH environment.
  - Changes in pH drastically change the intramolecular geometry and spectroscopic properties of the salts.

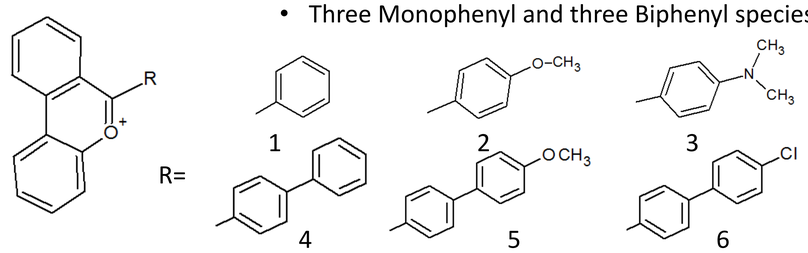




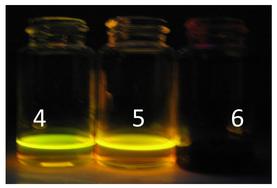
- To accomplish these goals we will use spectrofluometric analysis and UV-vis studies to examine the fluorescence and pH sensitivity respectively.

Previous Work: 6-aryldibenzo[b,d]pyrylium salts

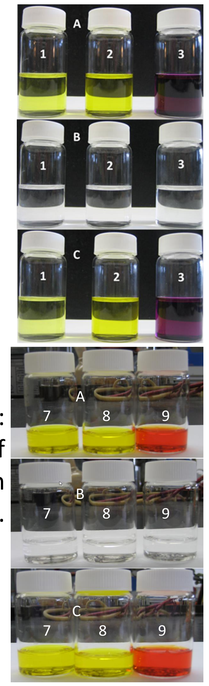
- To date six 6-aryldibenzo[b,d]pyrylium salts have been made.
  - Three Monophenyl and three Biphenyl species.



- Compounds 1-6 were found to be halochromic, and brightly colored in organic solvents
  - Triethylamine (TEA) addition = loss of color.
  - Trifluoroacetic acid (TFA) addition = colored state restoration.
- The cycle is maintained through several switches.
- Compounds 4 and 5 were also found to fluoresce in UV light.



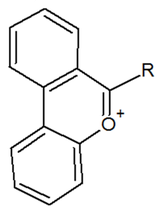
Above image: Florescence of compounds 4-6 in organic solvent.

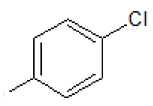


Right Image: Halochromism of compounds 1-6 when exposed to TEA and TFA.

Current Work: Mono and Biphenyl Switches

- Synthesis of more pyrilium switches:



R= 

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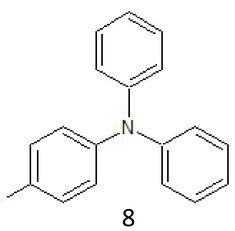

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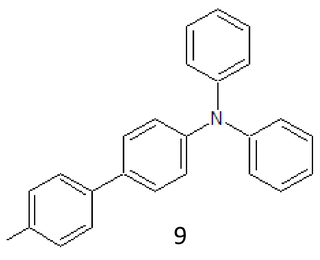

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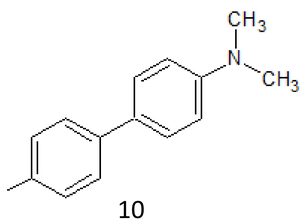

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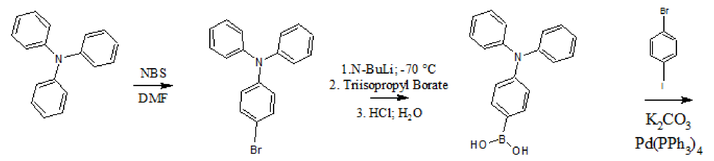
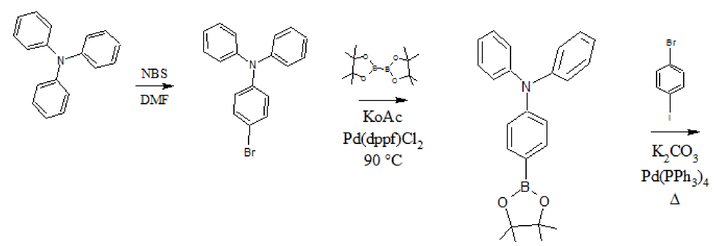
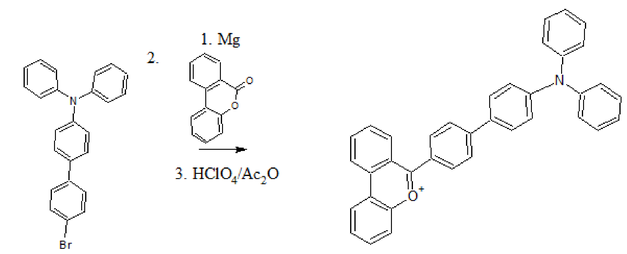
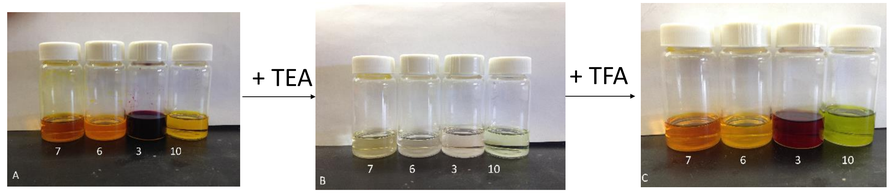
Example Synthesis







Switching and Mono vs Bi Phenyls



Future Studies:

- Quantitative studies of compounds:
  - Florescence and UV/Vis studies to confirm fluorescence patterns
  - NMR to confirm molecular composition

Acknowledgments

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