



The Synthesis and Halochromism of 6-Aryldibenzo[*b,d*]pyrylium salts

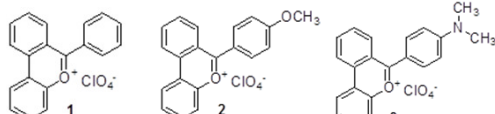
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Objective

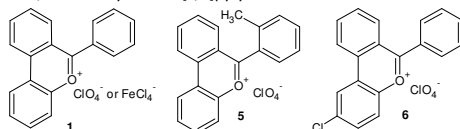
- Our objective is to synthesize different 6-aryldibenzo[*b,d*]pyrylium salts



- To examine their optical changes to pH environment along with their spectroscopic properties
- Changes in the pH environment are believed to have a dramatic affect on intramolecular charge transfer and are believed to be reversible
- To accomplish these goals we will use spectrofluorometric analysis and UV-vis studies to examine fluorescence and pH sensitivity respectfully

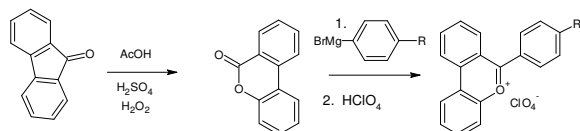
Background

- To date, three 6-aryldibenzo[*b,d*]pyrylium salts have been made:



- Compound 1 has not been fully characterized; only melting point and elemental analysis have been carried out
- Compound 1 has also been determined previously to be non-fluorescent
- Compounds containing the 6-aryldibenzo[*b,d*]pyrylium salts potentially hold promise as new synthetic dyes

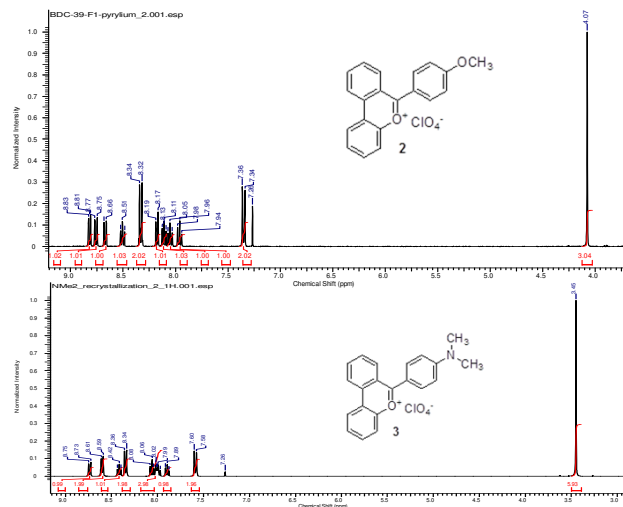
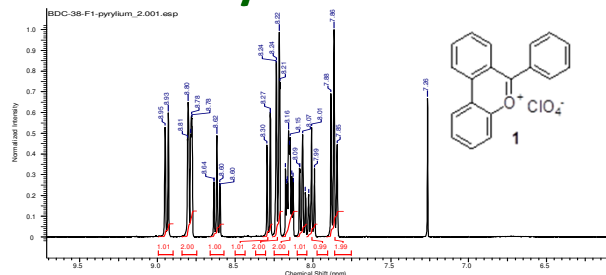
Synthetic Pathway



Carlson, E. J.; Riel, A.-M., S.; Dahl, B. J. *Tetrahedron Lett.* **2012**, 53, 6245-6249

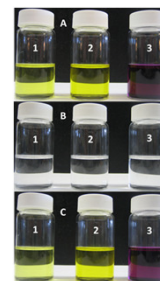
R= H or OCH₃ or N(CH₃)₂

NMR Analysis



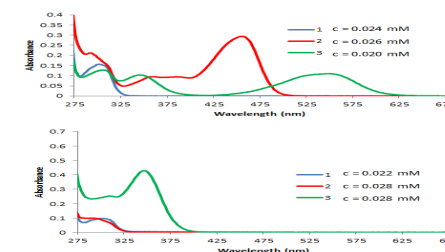
Studies

- Compounds 1-3 were found to be halochromic. In organic solution the compounds are brightly colored
- When triethylamine is added, all three compounds become colorless instantaneously
- Upon addition of trifluoroacetic acid, the color is regained
- This cycle is maintained several times through



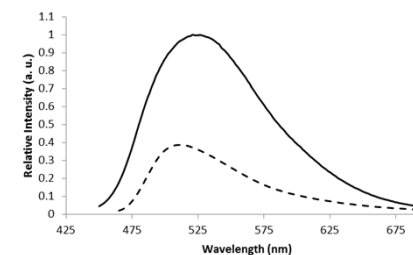
UV-Vis Studies

- The compounds were further analyzed by UV-Vis spectroscopy
- In acetonitrile compounds 2 and 3 exhibit intramolecular charge transfer in the visible spectrum
- Compound 1 does not absorb in the visible range
- Upon addition of triethylamine compounds 2 and 3 no longer absorb in the visible region
- I.e. conjugation has been disrupted



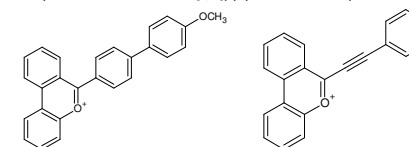
Fluorescence Studies

- Spectrofluorometric analysis shows that compounds 1 and 2 are indeed fluorescent in acetonitrile
- Compound 1 emits at 526 nm and compound 2 emits at 515 nm
- No detectable fluorescence was found after the addition of triethylamine for either compound
- Compound 3 was not found to be fluorescent at any wavelength



Future Studies

- Synthesis of the 6-dibenzo[*b,d*]pyrylium salts with spacers:



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