

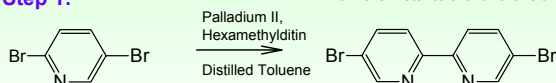
Continued synthesis of a fullerene/transition metal supramolecular system

Nicole King, Amber Shiveley, Heather McMillen, Nira Moore, Stuart Oehrle, Keith A. Walters

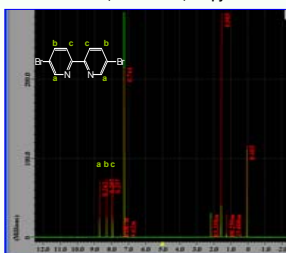
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Objective: The primary objective of our research is to create systems that efficiently move charge when excited by light. Such systems have possible applications in solar cell development, molecular device and computer applications. An example of a system in the making is a fullerene-transition metal system in which, a fullerene, C_{60} , is attached to a transition metal through a bipyridine ligand. Fullerenes have large absorption cross areas and readily accept multiple electrons, which serve as advantageous properties in photo-induced charge transfer applications. A rigid conjugated link between the fullerene and the metal has been designed to enhance the ability of charge to flow from the metal to the fullerene and vice-versa.

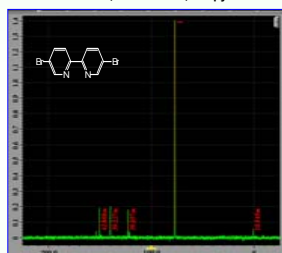
Bipyridine Ligand Synthesis Step 1:



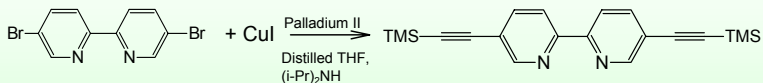
1H NMR of 5,5'-Dibromo-2,2'-Bipyridine



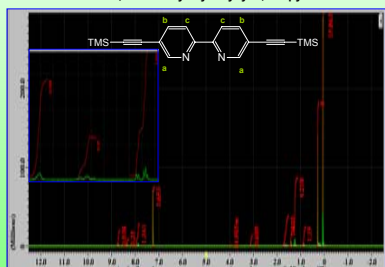
^{13}C NMR of 5,5'-Dibromo-2,2'-Bipyridine



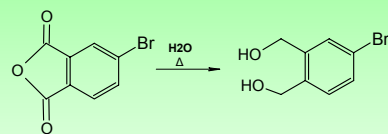
Step 2:



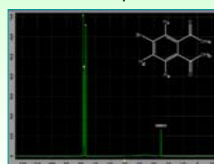
1H NMR of 5,5'-Trimethylsilyl-2,2'-bipyridine



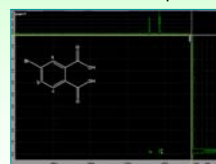
Fullerene Building Block Synthesis Step 1:



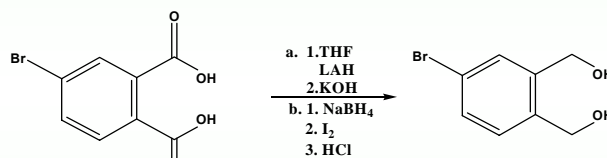
1H NMR of 4-Bromophthalic Acid



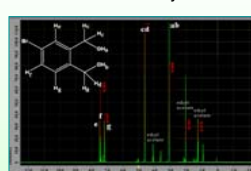
$^1H/^{13}C$ Correlation of 4-Bromophthalic Acid



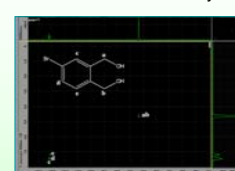
Step 2:



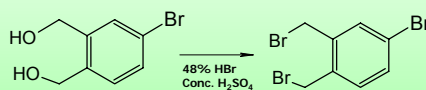
1H NMR of 4-Bromo-o-xylene



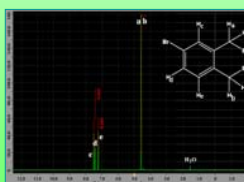
$^1H/^{13}C$ Correlation of 4-Bromo-o-xylene



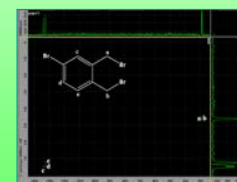
Step 3:



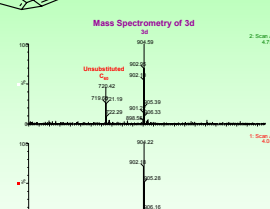
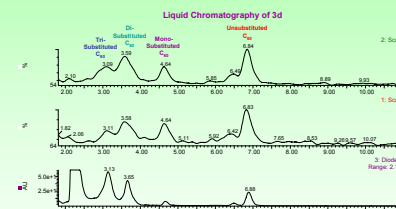
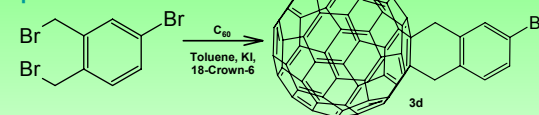
1H NMR of 4,α,α-Tribromo-o-xylene



$^1H/^{13}C$ Correlation of 4,α,α-Tribromo-o-xylene

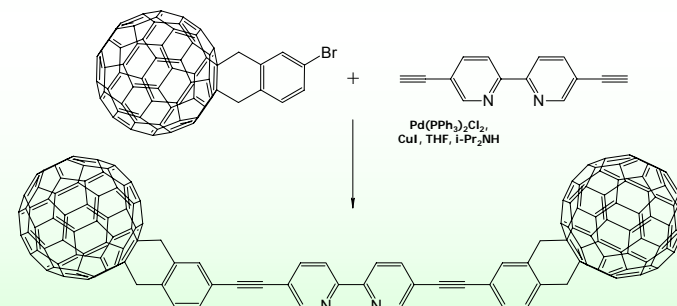


Step 4:



Next Steps:

The next step in the fullerene building block synthesis is obtaining an NMR spectrum of 3d by coupling 3d to propargyl alcohol to increase its solubility. After obtaining an NMR, 3d will be coupled to 5,5'-trimethylsilyl-2,2'-bipyridine, from the bipyridine ligand synthesis, producing a supramolecular system, which contains a bipyridine ligand bridge. This supramolecular system will be coordinated to various transition metals. The resulting complex will undergo a complete photo-physical evaluation.



References

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Acknowledgements

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