

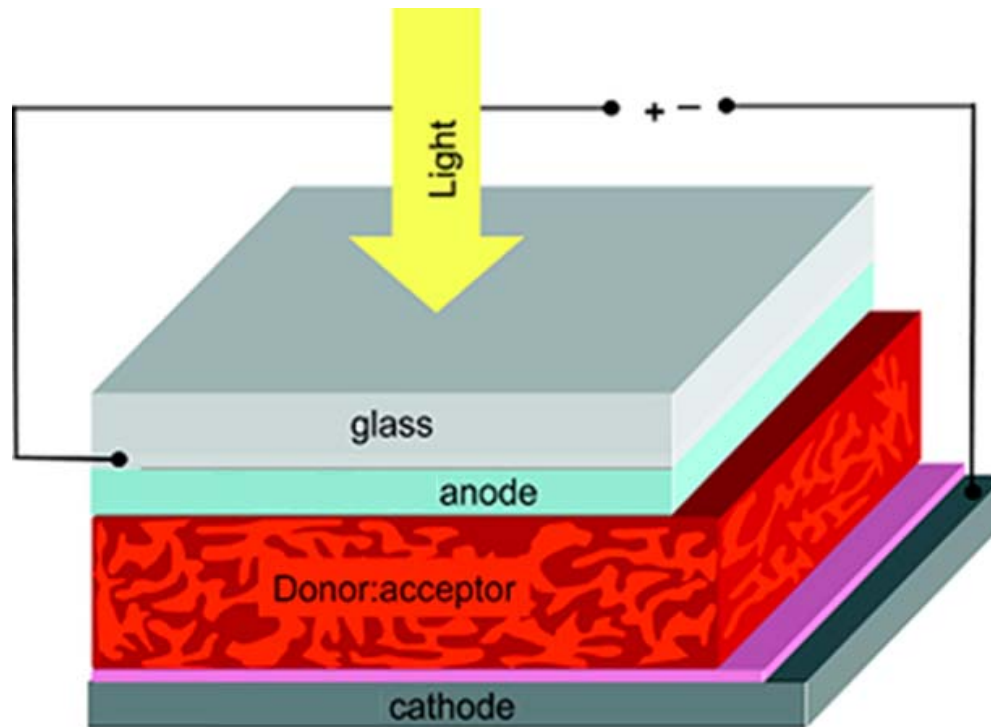
Synthesis of Low-Bandgap Conjugated Molecules for use in Organic Solar Cells

Sam Underwood | Dr. McCormick Group



Photo: www.plusplasticelectronics.com

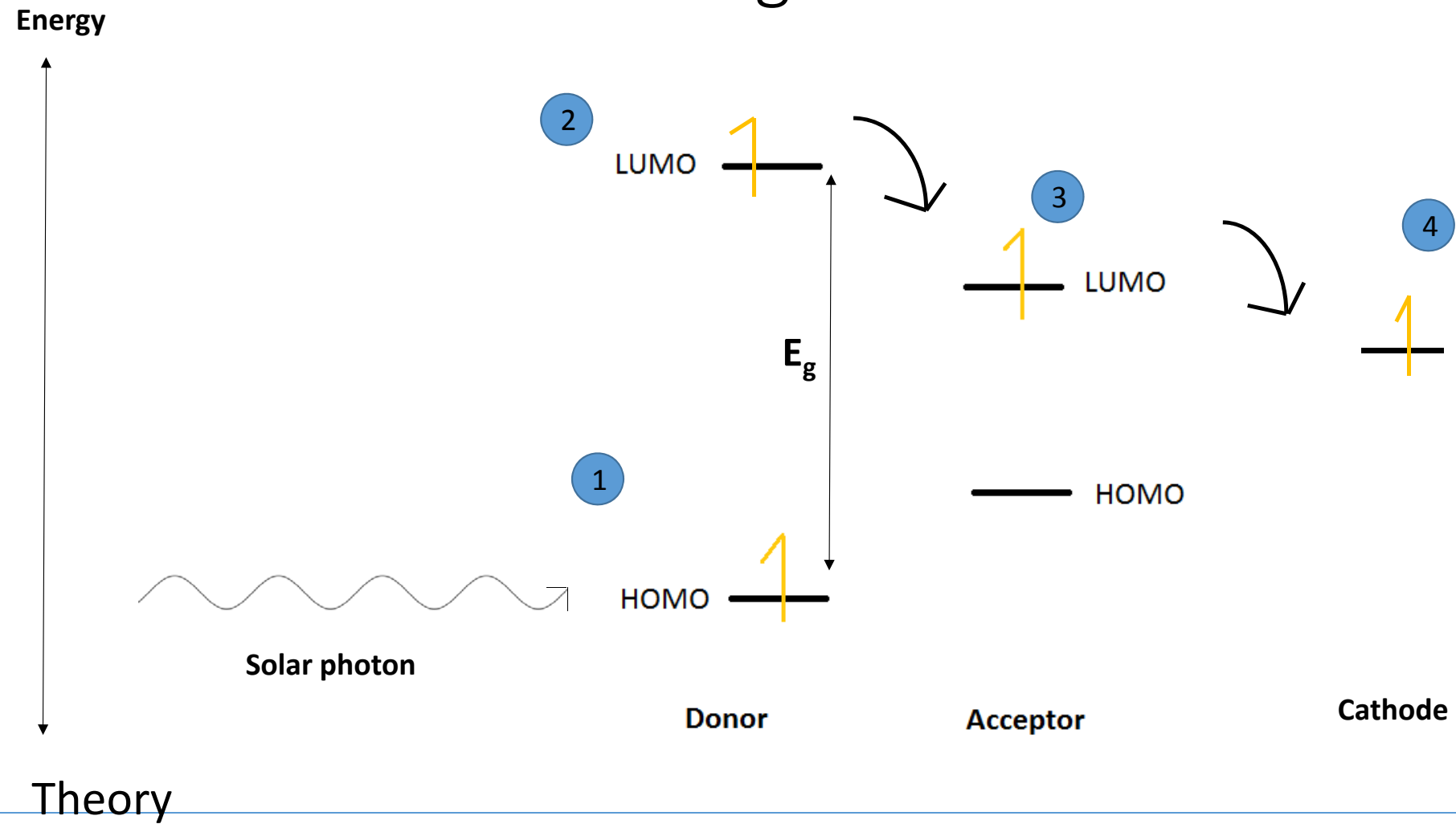
The Bulk Heterojunction Organic Photovoltaic (BHJ-OPV)



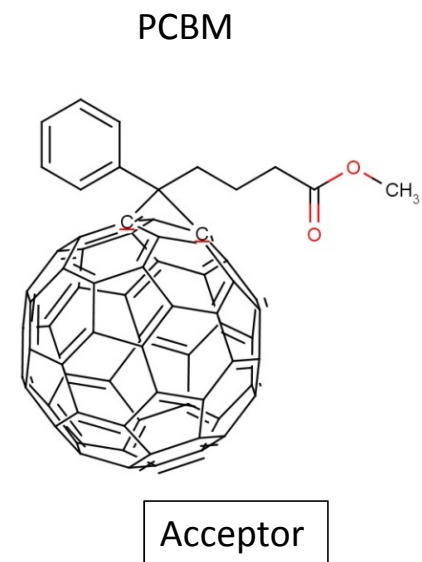
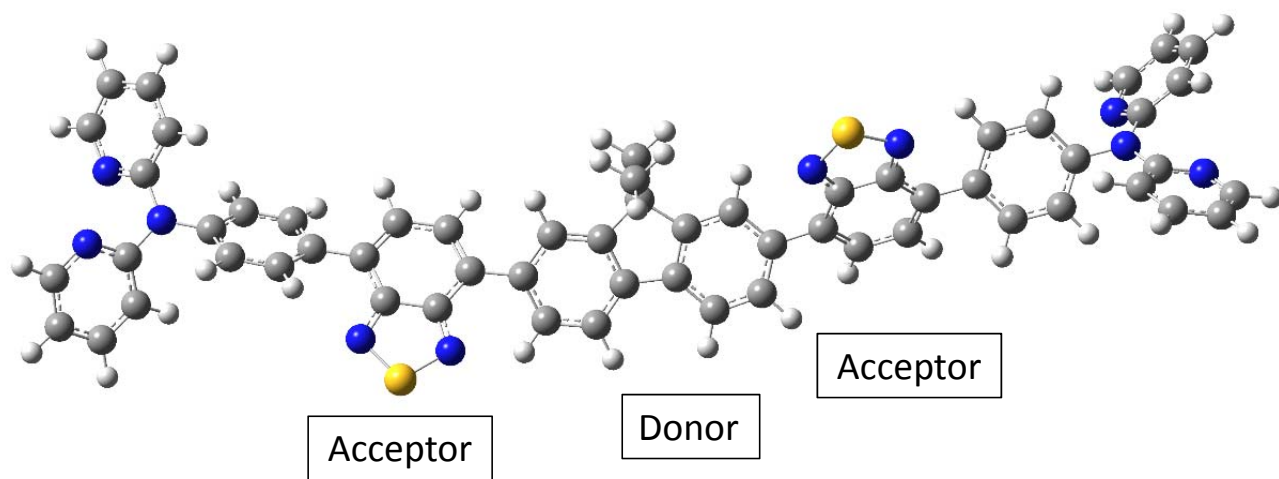
[1] Scharber, M., *et al.* Design Rules for Donors in Bulk-Heterojunction Solar Cells . J Adv. Mat. **2006**, 18, 789-794. [10.1039/B306630D](https://doi.org/10.1039/B306630D)

Theory

Charge Transfer

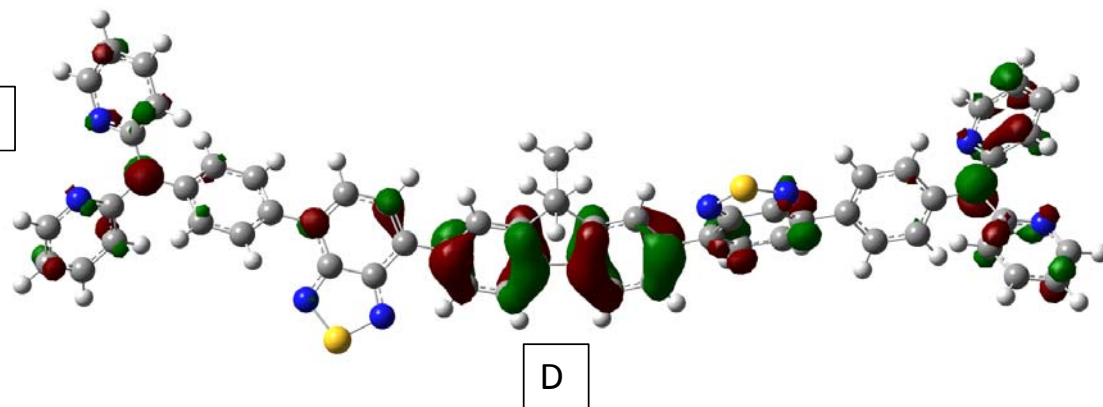


Donor Acceptor Alternating Polymers

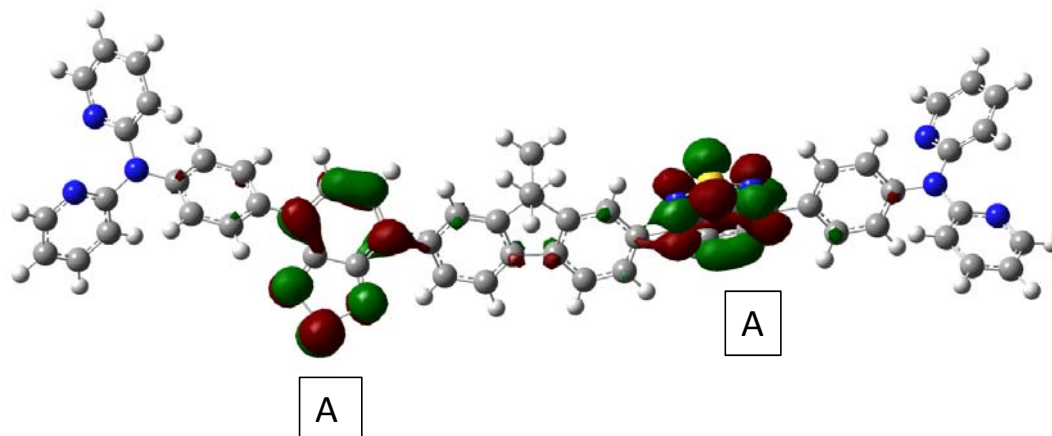


Molecular Orbital Calculations

HOMO

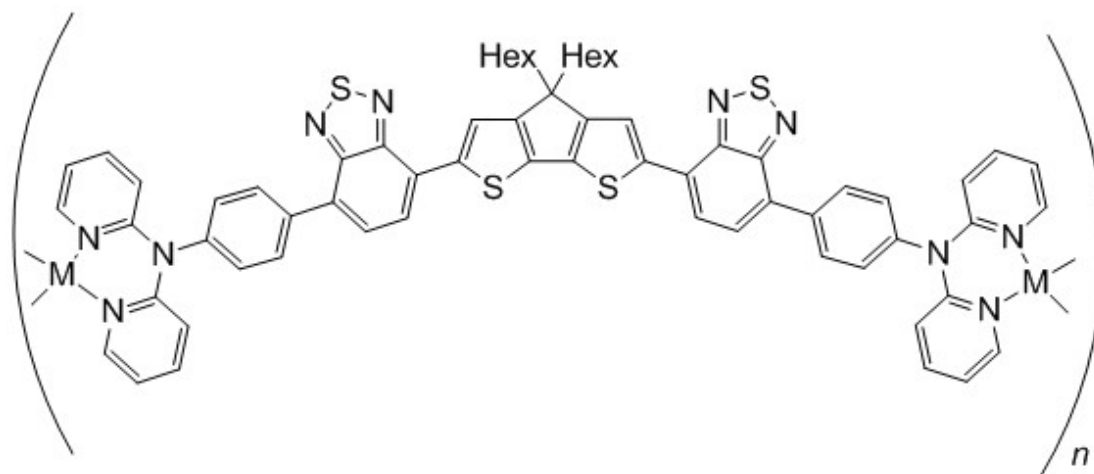


LUMO



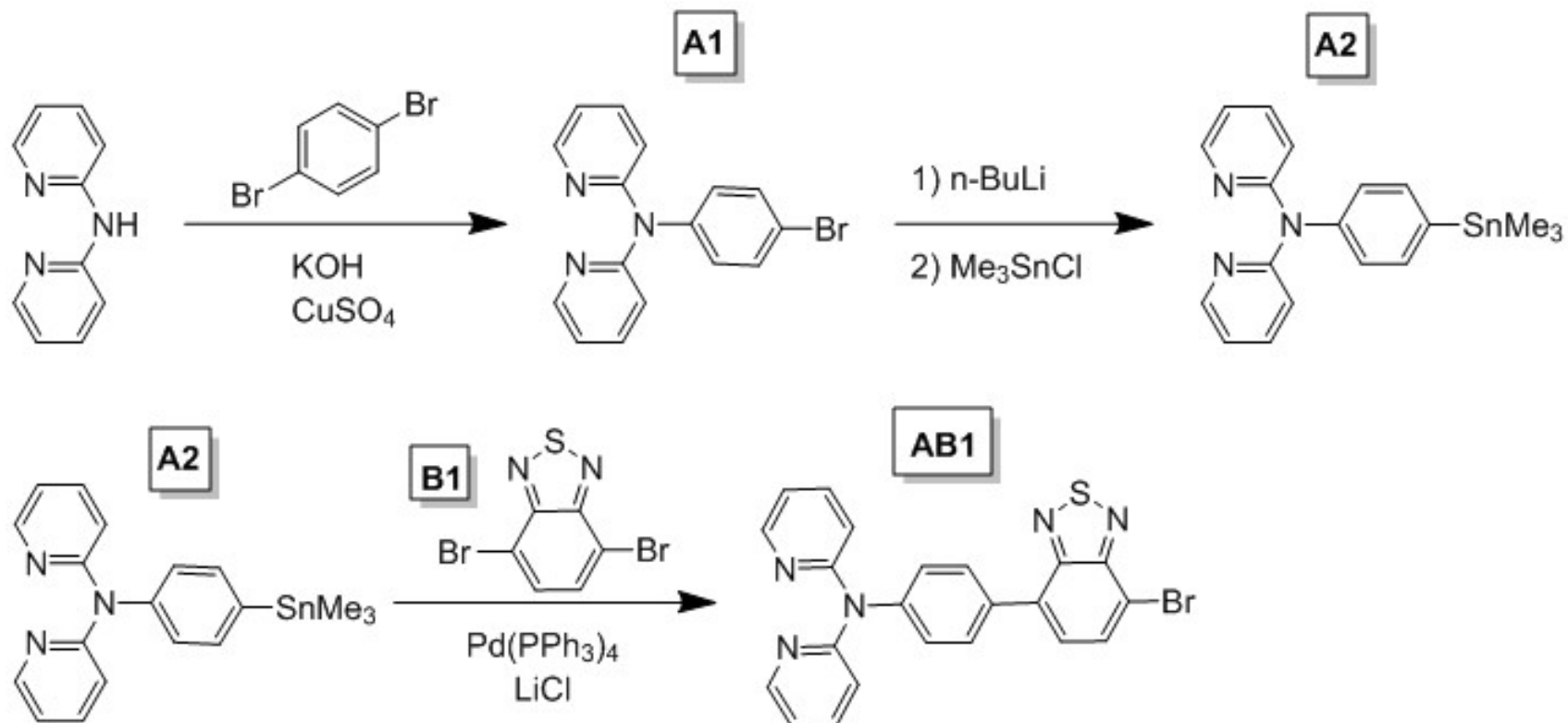
Theory

Polymerization



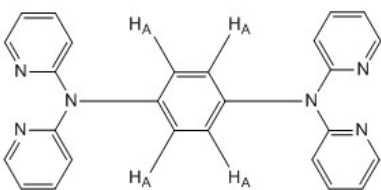
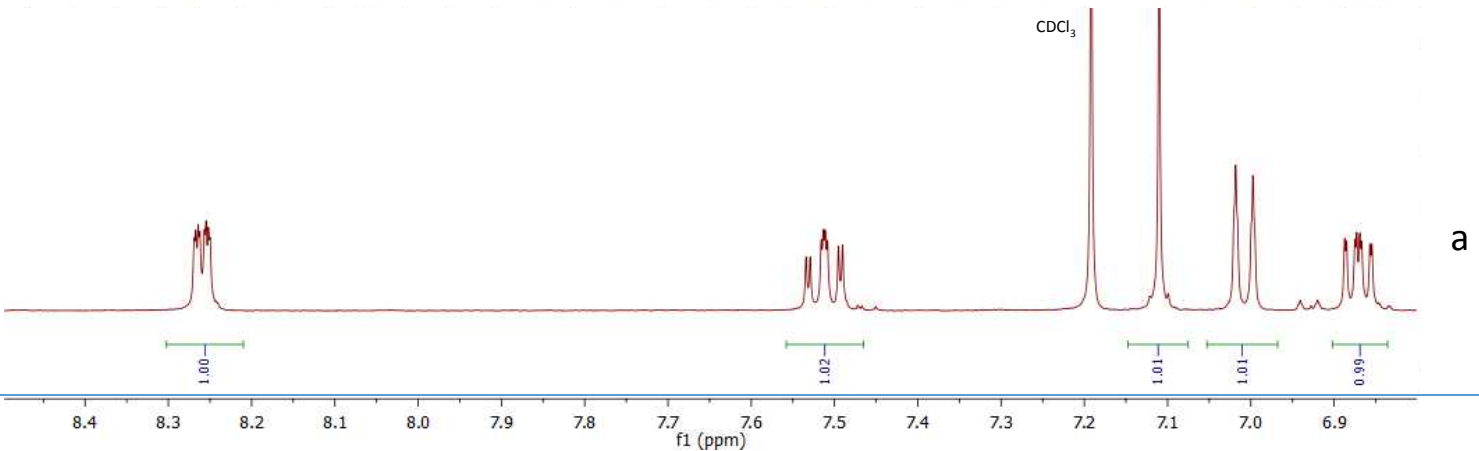
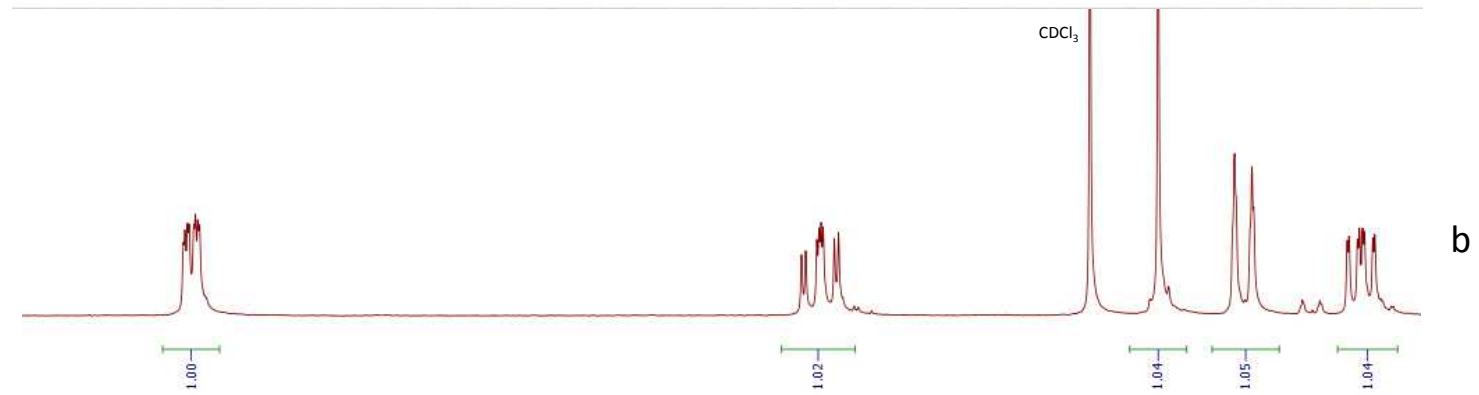
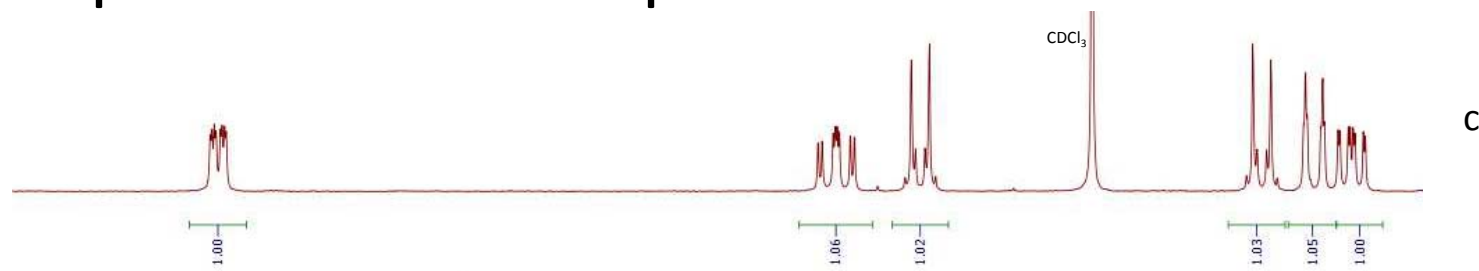
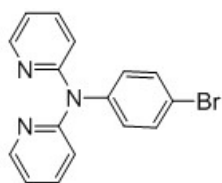
$M = Cu(I), Pt(II), Au(I), Ag(I), Pd(II), Zn(II)$

Synthesis of ligand end units



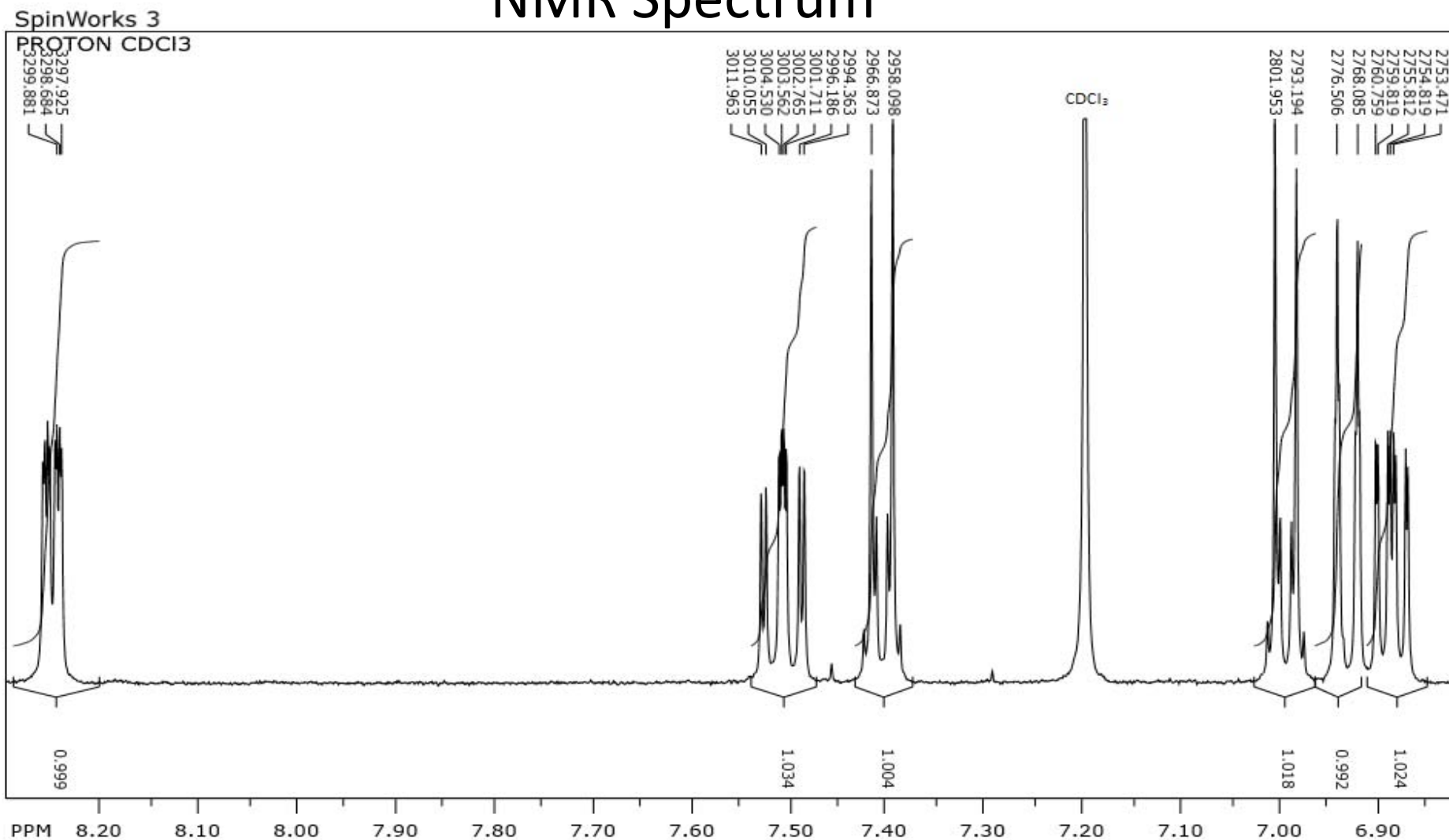
Synthetic Process

Comparison of NMR spectra



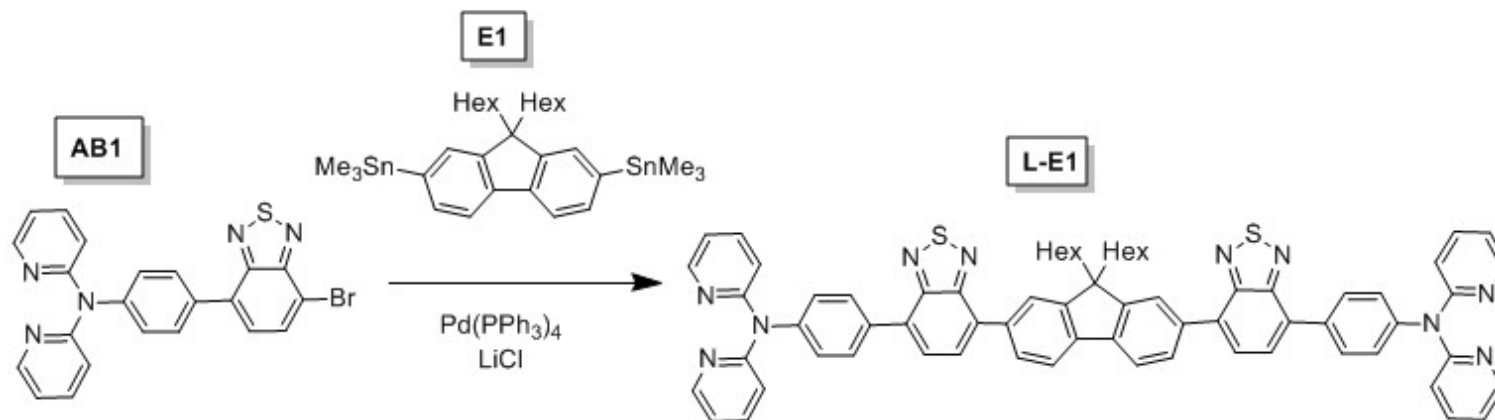
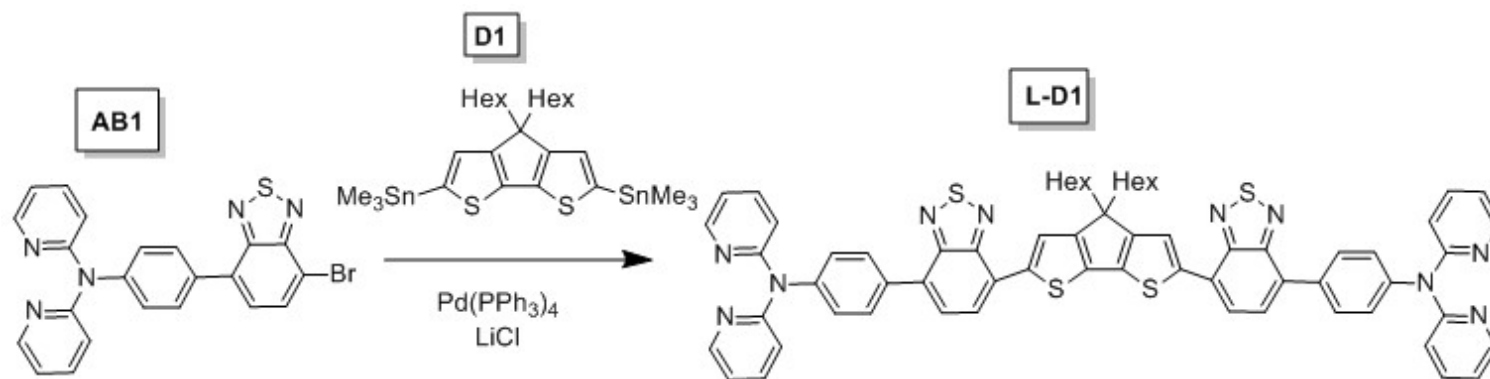
Data

NMR Spectrum



Data

Ligand Synthesis



Future Work

Thank you!

- Dr. Theresa McCormick
- Marius, Carolyn, Austin, Greg, Kevin, and Lee
- Dr. Erik Sánchez, Dr. Jun Jiao, and Lester
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- National Science Foundation



Questions?

