

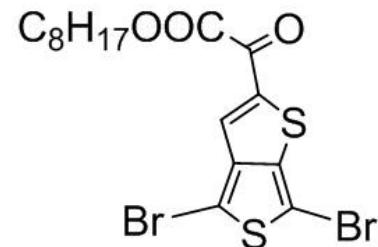
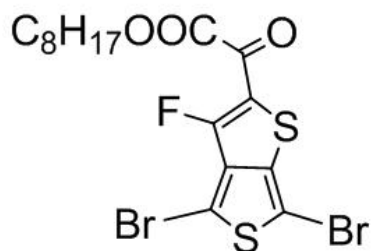
New Polymeric Materials for Energy Efficient, Low Cost Organic Solar Cells



Nabil Kleinhenz – Chemistry BS Polymer Track
Faculty Advisor: Wei You, Chemistry Department

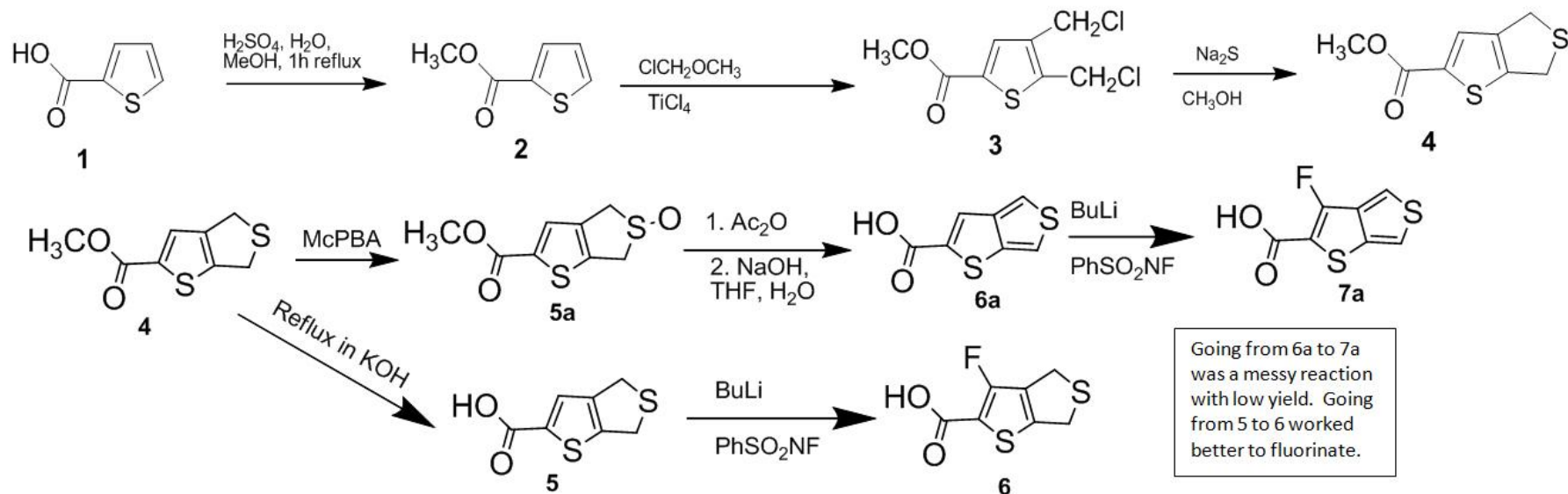
Project Background and Goals

- ▶ Economically competitive renewable energy is needed
 - Fossil fuels contribute to global warming, and could be depleted as a resource in a few decades
 - Current mainstream inorganic, crystalline silicon based solar cells are expensive to make – inhibits large scale use
- ▶ Our approach is to create new materials for organic solar cells
 - Using thin films of polymers with low manufacturing cost
 - But highest energy conversion efficiency in organic photovoltaic cells is currently only ~6% vs. silicon (25%)
- ▶ Our goal is to synthesize new, efficient low band gap polymers
 - My project is to synthesize variations of the monomers below and polymerize them with other molecules and test how well they convert the sun's energy into electricity in a solar cell



Results

- Synthesis completed so far:



- Desired monomers will be completed this semester, then polymerized and tested for efficiency

Literature Sources:

- Zwanenburg, D.j; Dehan, H.; Wynberg, H., *J. Org. Chem.* 1966, 31, 3363
- Yao, Y.; Liang, Y.; Shrotriya, V.; Xiao, S.; Yu, L.; Yang, Y., *Adv. Mater.* 2007, v. 19, no. 22, p. 3979-3983
- Liang, Y.; Feng, D.; Wu, Y.; Tsai, S.; Li, G.; Ray, C.; Yu, L.; *J. AM. CHEM. SOC.* 2009, 131, no. 22 p. 7792-7799