Introduction

Why Single-Walled Carbon Nanotubes?
- Unique physical properties
  - High carrier mobility
  - Strong optical absorption
  - Tunable electronic/optical bandgap
- Potential for many applications
  - Thermoelectrics
  - Solar Cells
  - Transistors

Sorting Strategies
- Some polymers are selective for certain semiconducting SWCNTs
- These polymers are not typically removable which may limit performance (i.e. reduce carrier mobility)
- PF-PD, among other polymers, were developed to be selective and removable
- PF-PD is also inexpensive and recyclable

Barriers to Adoption
- Variability in parameters limits use in applications
  - Polyydispersity
  - Diameter
  - Metallicity vs. Semiconducting

Project Outline

Variability in extraction of plasma torch s-SWCNT by batches of PF-PD
- Effects of wet versus dry toluene on quality of dispersions
  - Freshly made PF-PD vs Recycled supernatant (after polymer removal)
- Variations between batches of fresh PF-PD
- Low molecular weight PF-PD is too easily removed by polymer removal treatment
  - Make films from dispersions (no PR)
- TFA vapor treatment to remove polymer from films

Results & Conclusions

Conclusions: Dispersions made with water-contaminated toluene yielded less SWCNTs than those dispersions made with dry toluene.

Conclusions: Dispersions made with the recycled supernatant Batch 1 PF-PD give significantly less s-SWCNT. This implies that the recycled PF-PD would need to be decomposed into monomers and re-synthesized before reusing.

Conclusions: Significant amount of s-SWNTs are lost during the TFA treatment but the treatment is very effective in removing PF-PD from the films.