

# Aggregation Induced Emission in Stereospecific, Photoluminescent Polymers

Victoria Rubio<sup>1</sup>, Allison Abdilla<sup>2</sup>, Javier Read de Alaniz<sup>1</sup>, Craig J. Hawker<sup>1,2</sup>

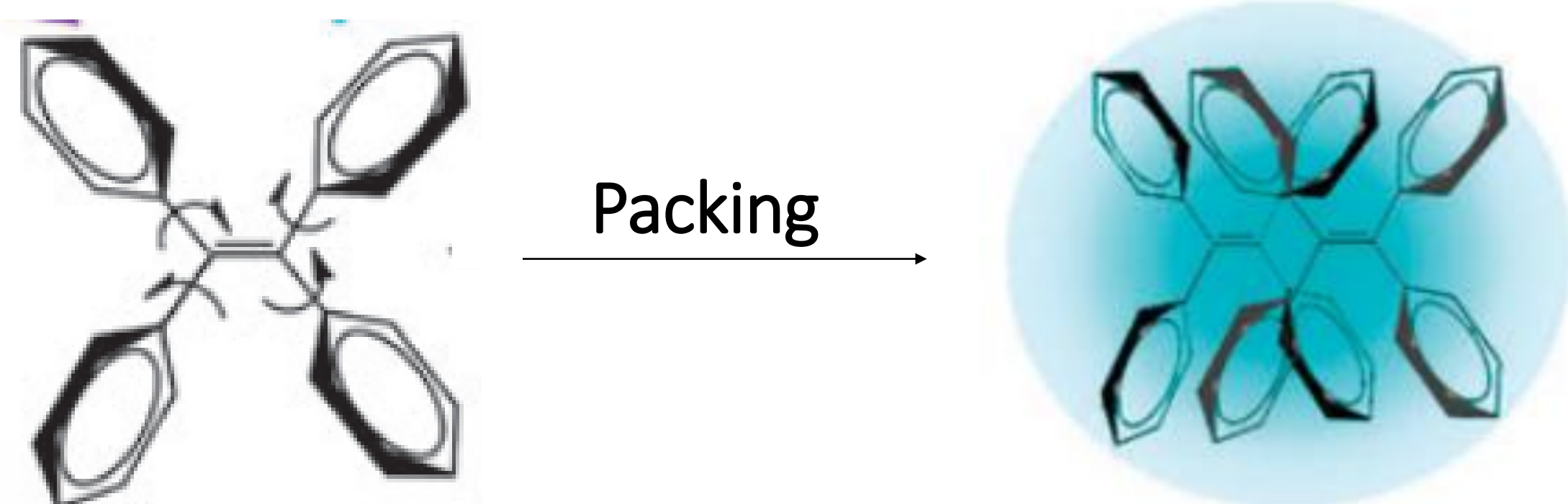
1. Department of Chemistry, University of California, Santa Barbara, CA

2. Materials Research Laboratory, University of California, Santa Barbara, CA

## 1. Aggregation Induced Emission

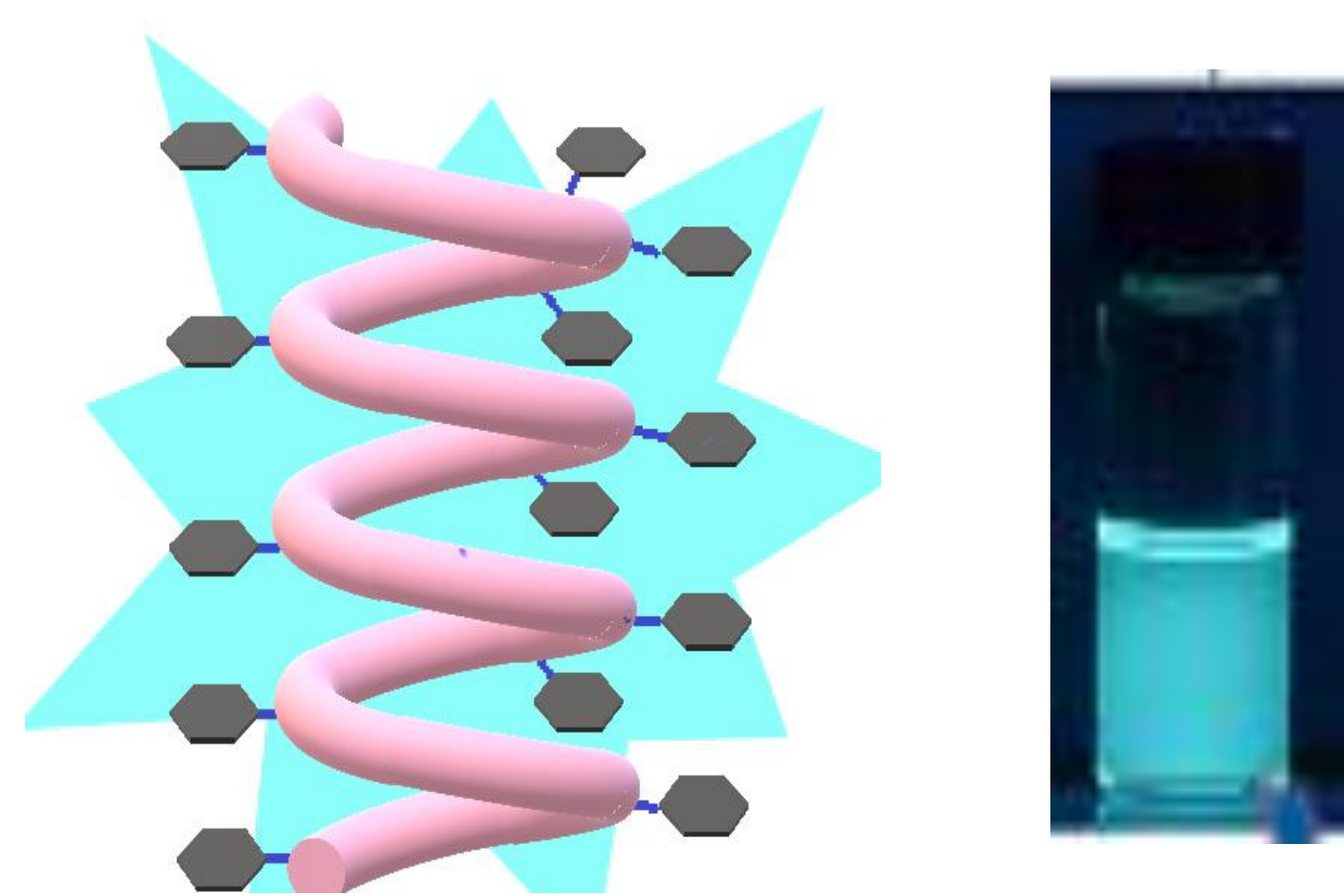


Aggregation induced emission (AIE) is a rare phenomenon in which fluorophores emit light when closely packed together in solid, clumpy states known as aggregates. These fluorescent dyes can act as a unique tool to visualize nanoscale structures and processes such as folding, packing, etc.



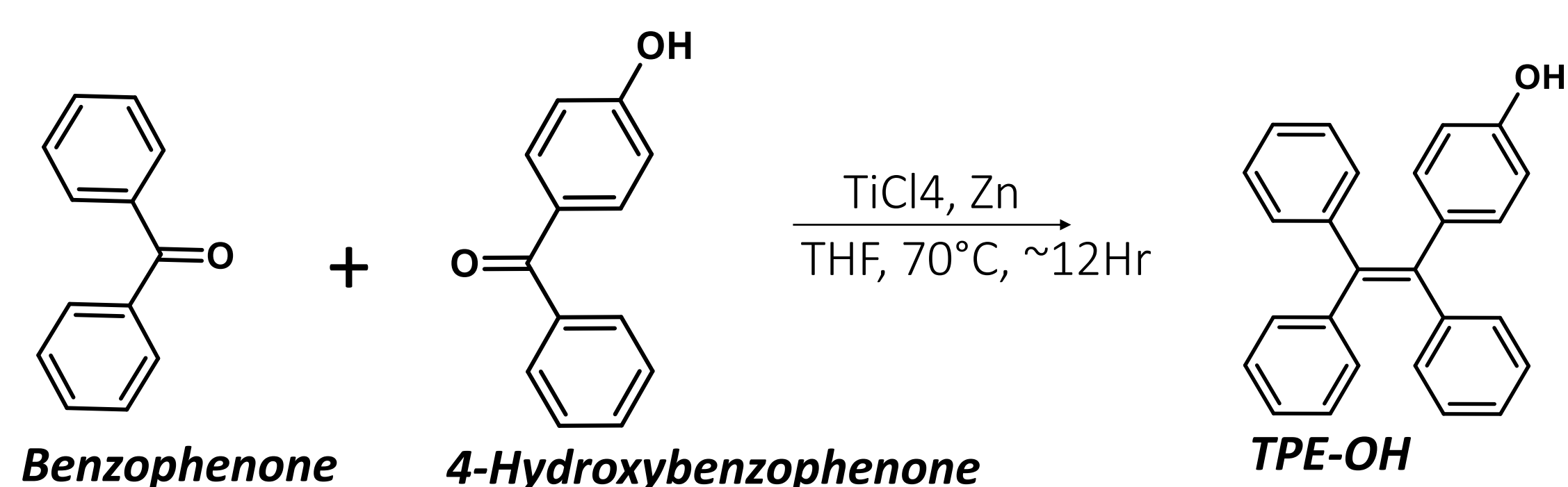
In our research, we explore:

- the ability to switch AIE activity on/off
- probing the helical conformation of these molecules through external stimuli
- the relationship between stereoregularity and helix formation

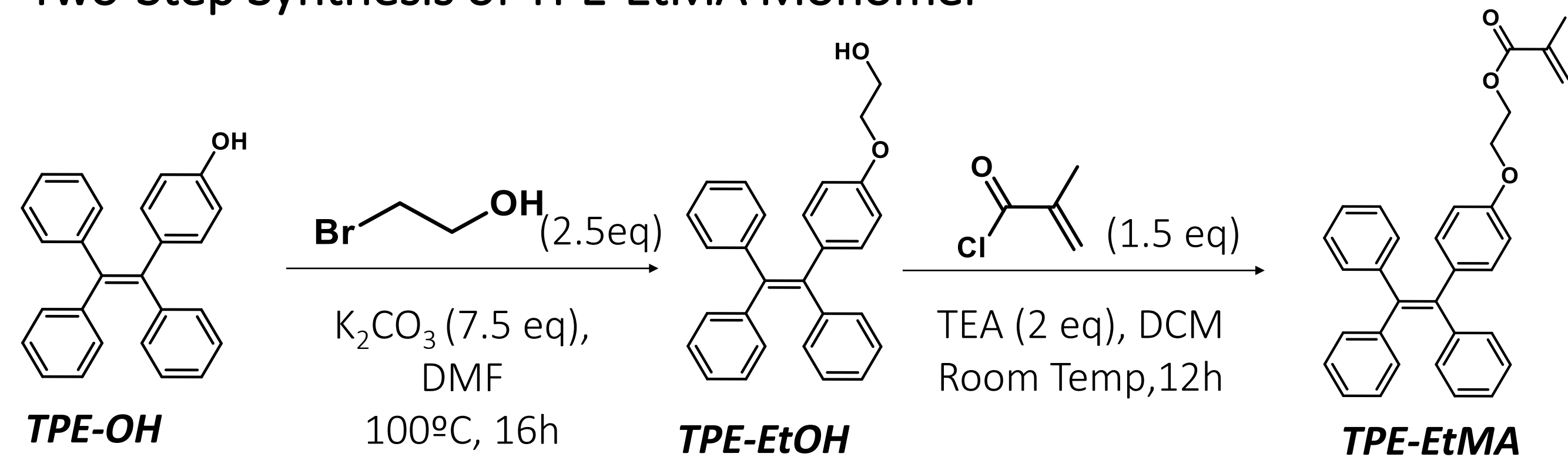


## 2. Synthesis of TPE-EtMA Monomer

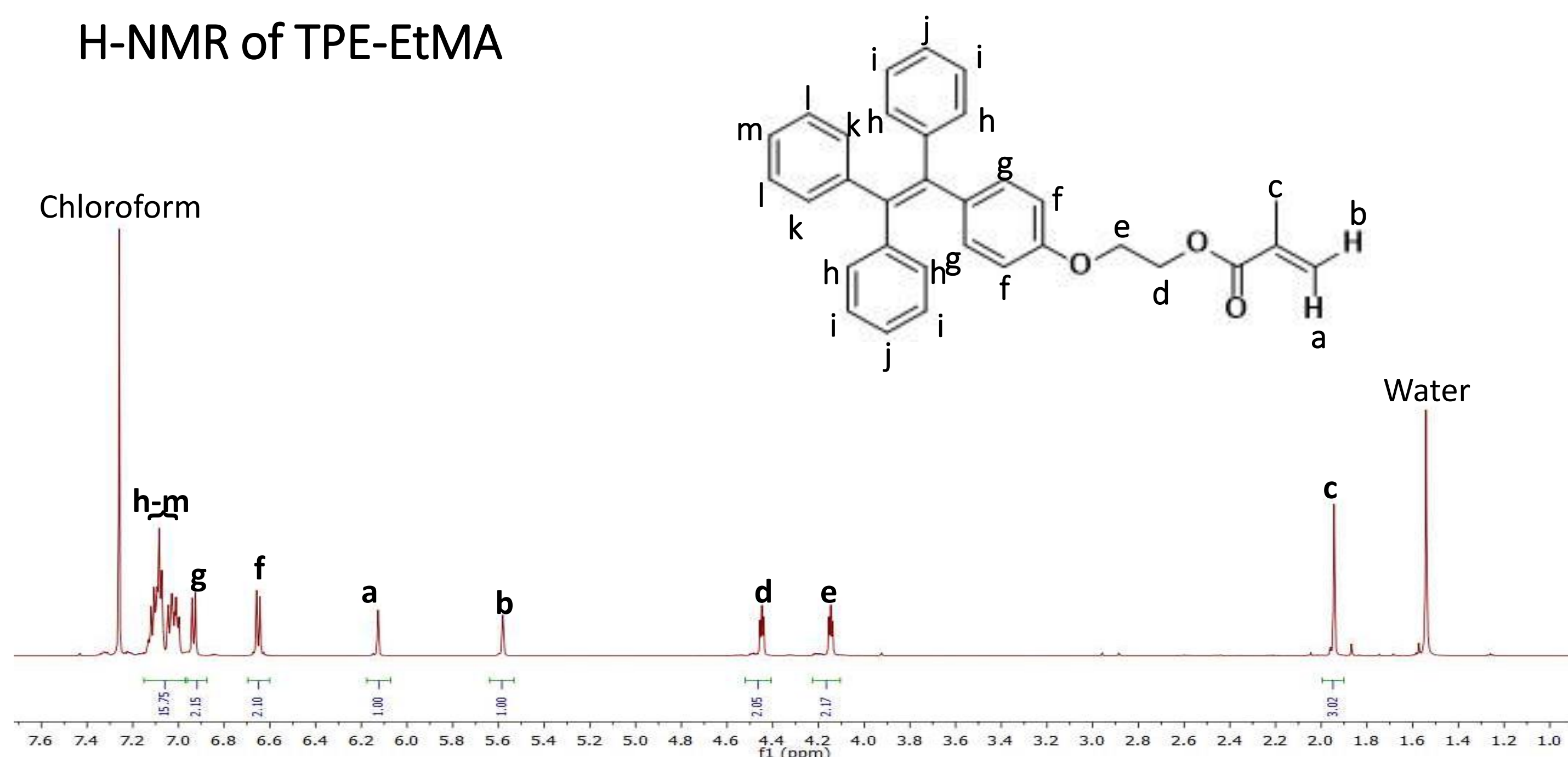
### McMurry Coupling



### Two-Step Synthesis of TPE-EtMA Monomer



### H-NMR of TPE-EtMA



## 3. Optimal Storage Conditions for TPE-EtMA



Disadvantages of autopolymerization:

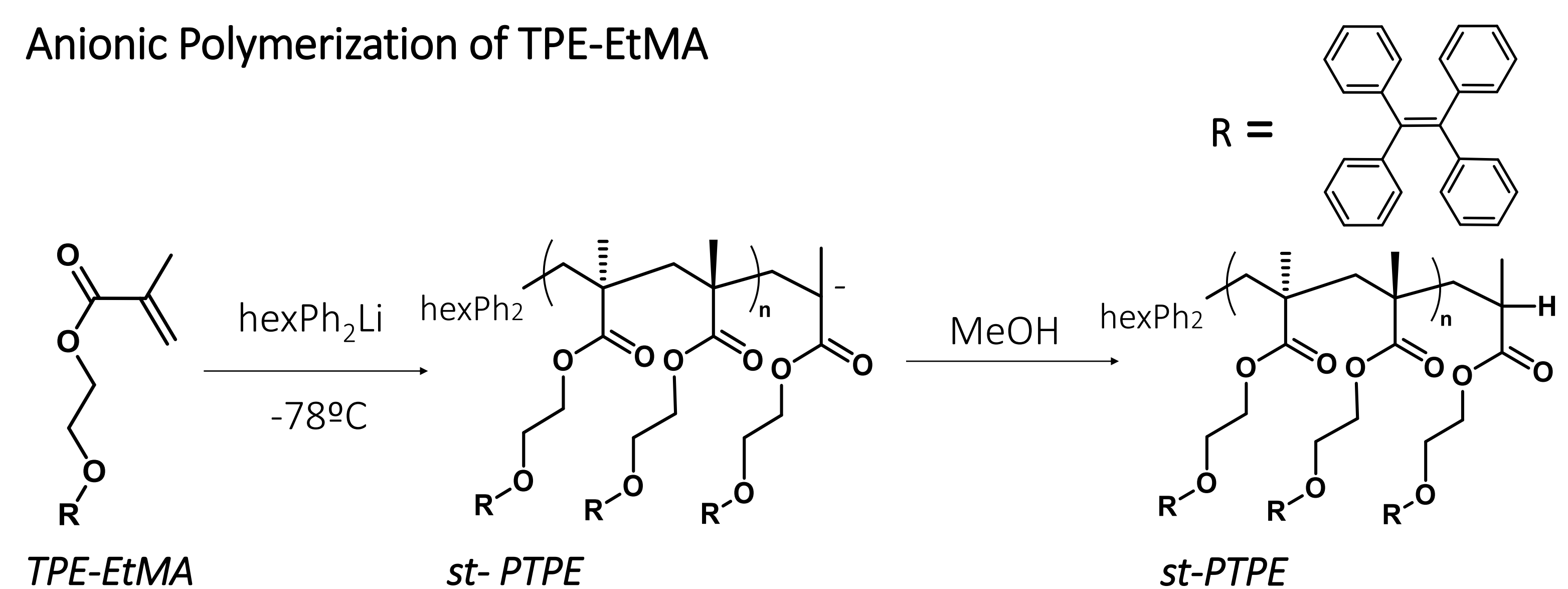
- uncontrollable chain lengths
- unable to form helices
- monomer can no longer undergo controlled polymerization

Ideal Storage Choice

	i	ii	iii	iv	v	vi
<b>Gas</b>	O <sub>2</sub>	Ar	Ar	Ar	Ar	Ar
<b>Temperature</b>	-20°C	25°C	-20°C	-20°C	-20°C	-20°C
<b>Solvent</b>	Toluene	Toluene	THF	Toluene	Toluene	Toluene
<b>Light</b>	Dark	Dark	Dark	<b>Light</b>	Dark	Dark
<b>Concentration</b>	30mg/mL	30mg/mL	30mg/mL	30mg/mL	<b>Solid</b>	30mg/mL
<b>Autopolymerization</b>	0%	0%	0%	0%	0%	0%

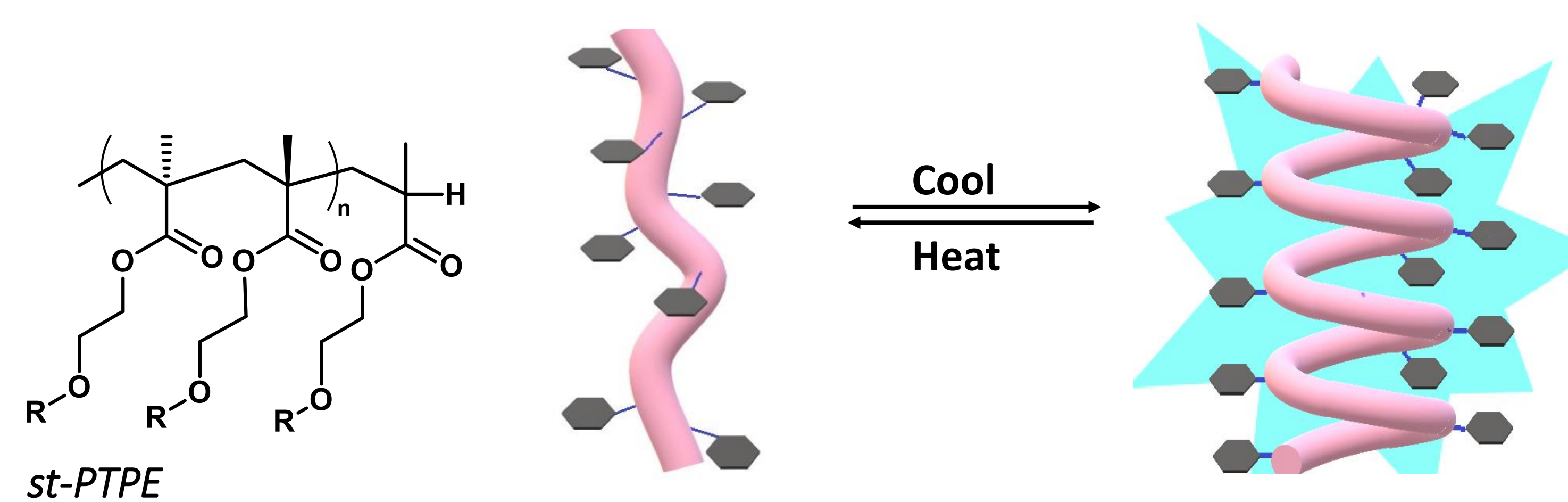
## 4. Polymerization of stereospecific TPE-EtMA

### Anionic Polymerization of TPE-EtMA

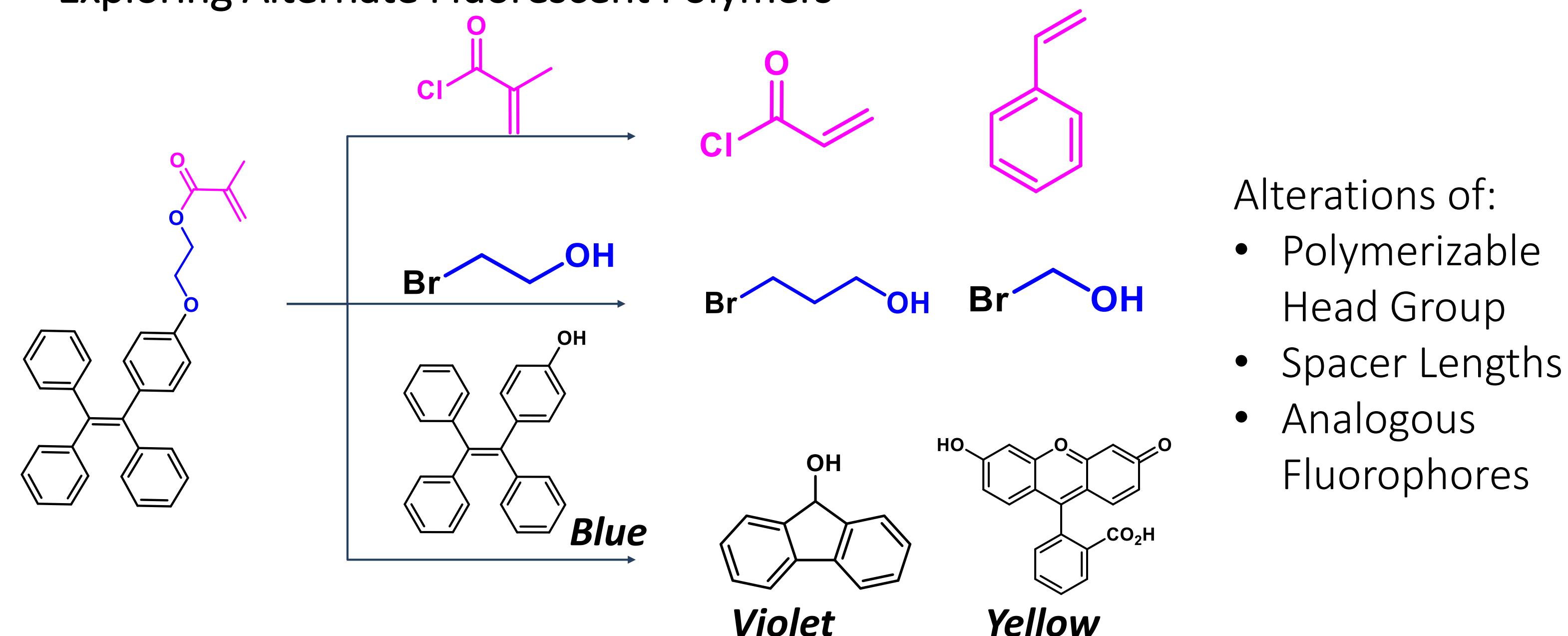


## 5. Future Research

### Helix Formation of PTPE Promotes Fluorescence



### Exploring Alternate Fluorescent Polymers



- Alterations of:
- Polymerizable Head Group
  - Spacer Lengths
  - Analogous Fluorophores

Contact Information:

Department of Chemistry, UC Santa Barbara,  
Santa Barbara, California, USA, 93106  
victoriarubio@ucsb.edu

Acknowledgements:



Craig Hawker



Javier Read de Alaniz



Allison Abdilla

Funding:

