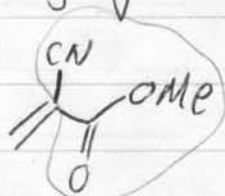
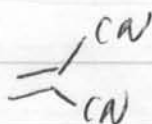


The suitability of a monomer can be predicted from the strength of the electron withdrawing group,

Initiator
water

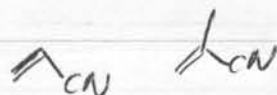
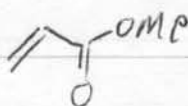
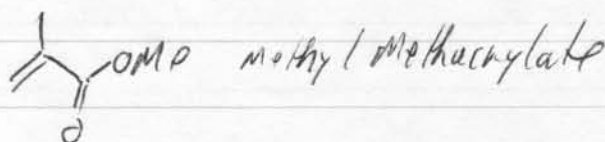
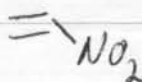


Can't Polymerize Radically
Can Anionically
strong electron withdraws
weak anionic base



Strength of electron withdrawing groups

Nucleophilicity
of
The Initiator



Lithium Reagent



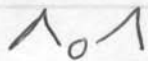
weak electron withdrawers
strong anionic base dependent

For the less electron withdrawing groups a stronger initiator is needed (for the bottom row Lithium reagents are necessary). A strong initiator is a highly nucleophilic initiator.

Solvents

Solvents for anionic polymerization must be dry and air free (Teflon stir bars cannot be used, glass stir bars must be used.)

Solvent



diethylether



Benzene



pentane



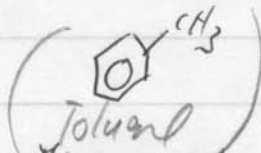
THF



cyclohexane



hexane



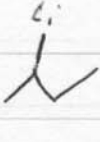
Toluene
This may act
as a more reactive
carbanion

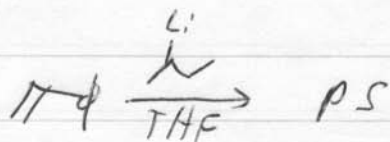
Generally, a lithium reagent and sodium naphthalene are used.

Termination

Termination does not occur in many systems.

Example

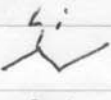
Polymerize $\pi\phi$ using  in THF
DP = 1000



10 grams of $\pi\phi$ (0.1 moles)

Add THF until the solution is 200 ml

$$[M] = 0.5 \text{ M}$$

Add 0.1 millimoles of 

$$[M^-] = 0.0005 \text{ M} \quad \frac{[M]}{[M^-]} = 1000$$

We react in THF  at 25°C

$$R_p = \underbrace{(K_p^+)}_{\text{Ion Pair}} [PSLi] [M] + \underbrace{(K_p^-)}_{\text{Free ion}} [PS^-] [M]$$

We wish to know which term, (A) or (B) is most important.

we have,

$$PSLi \rightleftharpoons [M^-]$$

$$K_0 = \frac{[Li^+] [PS^-]}{[M^-]} = \frac{[PS^-]^2}{[M^-]}$$

we have

$$[PS^-] = (K_0 [M^-])^{1/2}$$