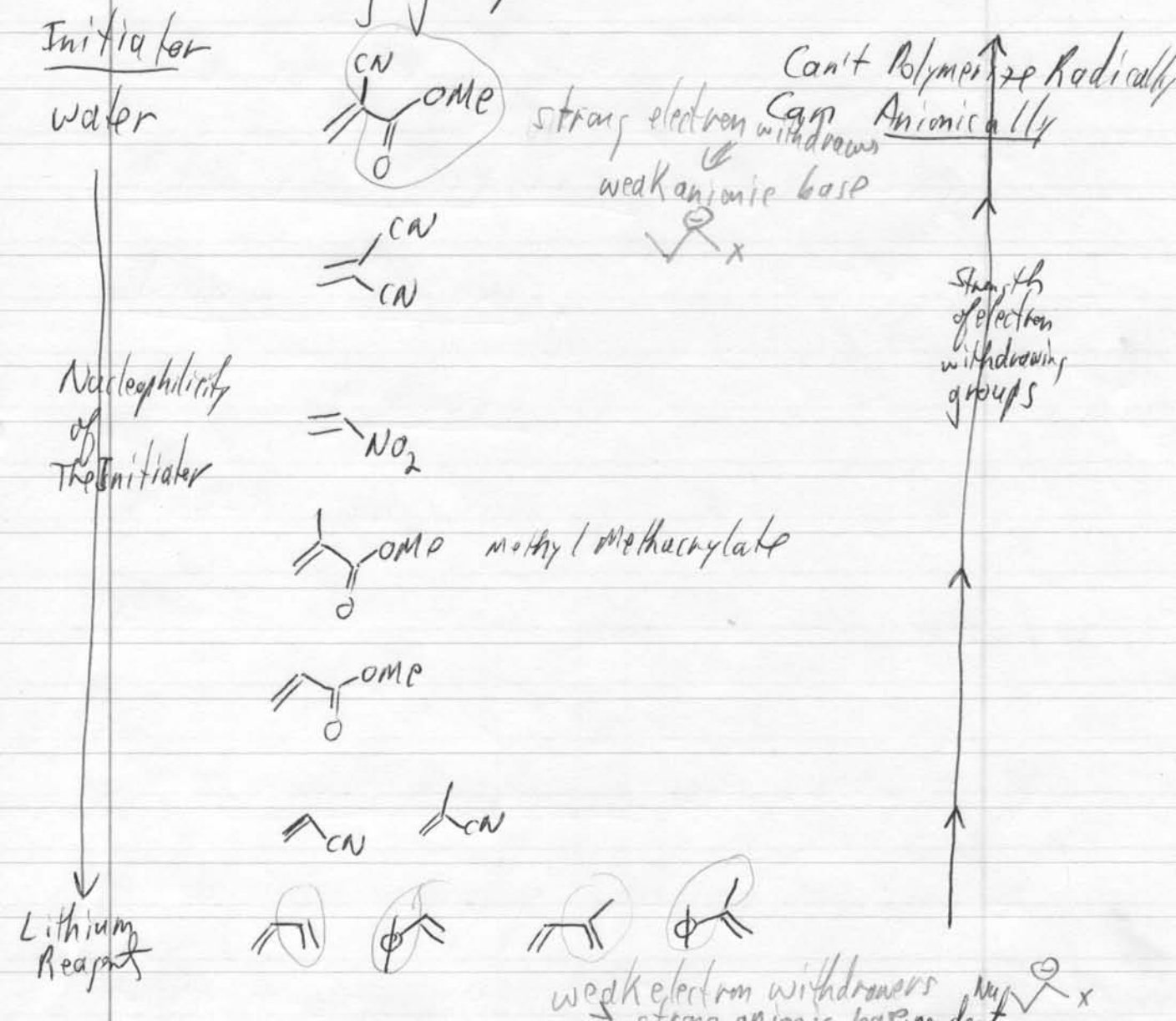
The suitability of a monomer can be predicted from the strength of the electron withdrawing groups,

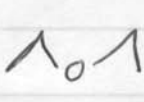


For the less electron-withdrawing groups a stronger initiator is needed (for the bottom row Lithium reagents are necessary). A strong initiator is a highly nucleophilic initiator.

Solvents

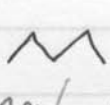
Solvents for anionic polymerization must be dry and air free (teflon stir bars cannot be used, glass stir bars must be used.)

Solvents



diethylether

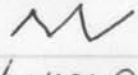
Benzene



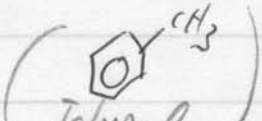
pentane

THF

cyclohexane



hexane



Toluene

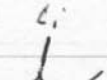
This may act as a more reactive carbanion

Generally, a lithium reagent and sodium napthalene are used.

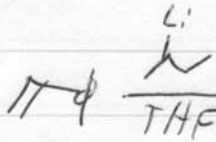
Termination

Termination does not occur in many systems.

Example

Polymerize  using  in THF

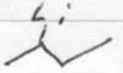
DP = 1000



10 grams of (0.1 moles)

Add THF until the solution is 200 ml

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

Add 0.1 millimoles of 

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

We react in THF  at 25°C

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

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

We have,

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

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

We have

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