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

**Initiator**
- Water

**Nucleophilicity of the Initiator**
- $\text{CN}$
- $\text{NO}_2$
- Methyl methacrylate
- $\text{CN}$

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.
Solvants

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

Solvants

diethyl ether  \( \text{Benzene} \)  pentane  THF

cyclohexane  hexane  \( \text{This may react as a more reactive carbon ion} \)

Generally, a lithium reagent and sodium napthalene are used.

Termination

Termination does not occur in many systems.
Example

Polymerize \( \Phi \) using \( Li \) in THF

\[ DP = 1000 \]

\[ \Phi \xrightarrow{THF} PS \]

10 grams of \( \Phi \) (0.1 moles)
Add THF until the solution is 200 mL
\[ [M_3] = 0.5 \text{ M} \]
Add 0.1 millimoles of \( Li \)
\[ [M_3] = 0.0005 \text{ M} \]
\[ \frac{[M_3]}{[M_3]} = 1000 \]

We react in THF \( \circ \) at 25\(^\circ\)C

\[ R_P = (k_+ \overset{\text{Ion Pair}}{\text{[PSL]}} [M_3] + (k_- \overset{\text{FReation}}{\text{[PS]}} [M_3]) \]

We wish to know which term, \( \overset{\text{A}}{\text{or}}\overset{\text{B}}{\text{is most important.}} \]

we have,

\[ [PSL] \approx [M_3] \]

\[ K_0 = \frac{[C.0][PS^{-3}]}{[M_3]} = \frac{[PS^{-3}]}{[M_3]} \]

we have

\[ [PS^{-3}] = \left( K_0 [M_3] \right)^{1/2} \]