CONCEPT: ANIONIC POLYMERIZATION

- Alkenes with electron-_____ groups undergo anionic polymerization.
  - □ A strong _____ (e.g. $NaNH_2$ or _____) initiates the reaction.

Anionic Polymerization

Anionic Polymerization Mechanism

- The reaction mechanism has 3 steps.

Step 1 Initiation | **Step 2** Propagation | **Step 3** Termination

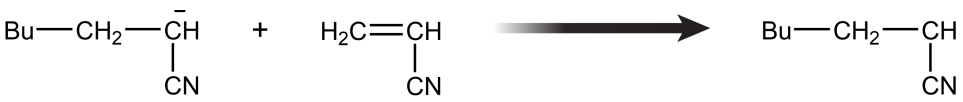
STEP 1: The strong nucleophile attacks the double bond similar to _____ addition.

- □ The electron-withdrawing group stabilizes the _____ charge.

Chain Initiation

STEP 2: The monomer anion reacts with a monomer molecule and forms a new anion through head-to-tail addition.

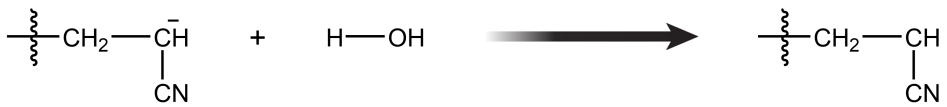
Chain Propagation



STEP 3: Unlike radical and cationic polymerization, anionic polymerization does not self-terminate.

- □ **Living Polymers:** The chain remains _____ after consuming all monomers.
- □ The chain can be terminated by adding a proton _____ (e.g. _____).

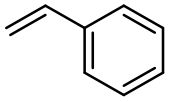
Chain Termination

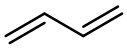


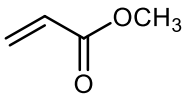
CONCEPT: ANIONIC POLYMERIZATION

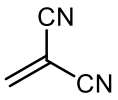
EXAMPLE: A catalytic amount of a strong base (NaOH) can catalyze the polymerization of 4-vinylpyridine. Draw the structure of the anion (from the initiation step) and the repeating unit of the polymer.

PRACTICE: Which one of the following compounds would undergo anionic polymerization at the fastest rate?

a) 

b) 

c) 

d) 

PRACTICE: A student was preparing nitroethene from the reaction of nitromethane with formaldehyde in an acidic solution. In the workup step, they accidentally added a small excess of NaOH, resulting in a white coating on the inside wall of the reaction flask. What is the structure of the compound in the white coating?