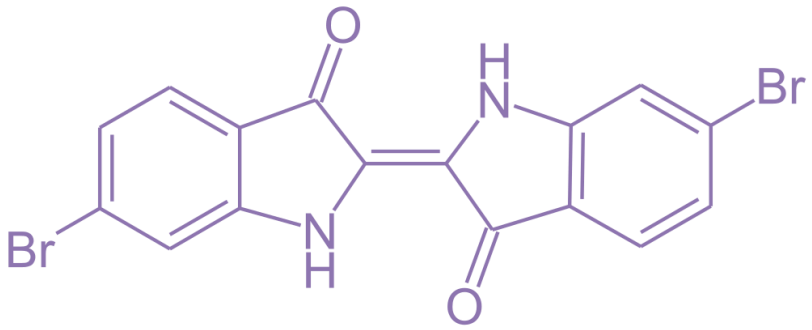
Lab 5: Stereochemistry of *Bromine* Addition to Alkenes

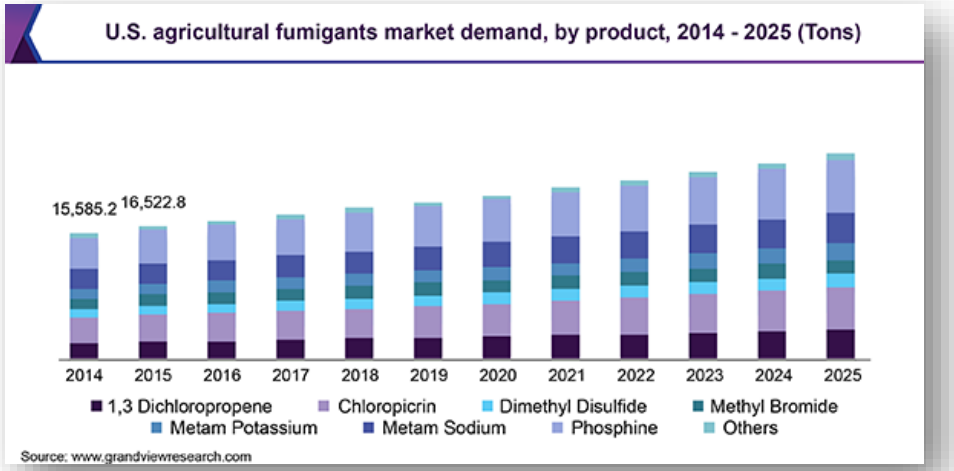
Quenching Reagents, Determining Unknown Products Using Melting Points

Bromine

https://www.youtube.com/watch?v=U-G4TZzVeZ0&t=317s

Bromine





120 pounds of snails = one gram of pure purple dye powder

Quenching Reagents

- General Purposes:
  1. Stopping the reaction by deactivating reaction components responsible for reactivity
  2. Neutralizing otherwise dangerous reaction components before handling
- In this case:
  - We are using bromine for halogenation reactions
  - Bromine is toxic, corrosive, and highly reactive
  - To safely isolate our products, we need to neutralize the bromine

Stereochemistry of Bromine Addition to Alkenes

- We add cyclohexene to the reaction until the red color is gone
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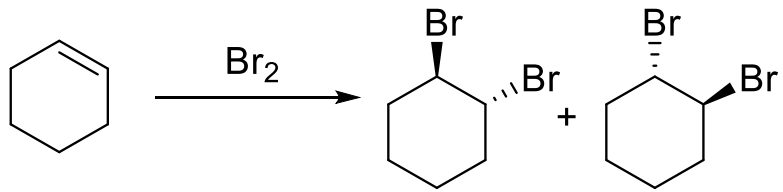
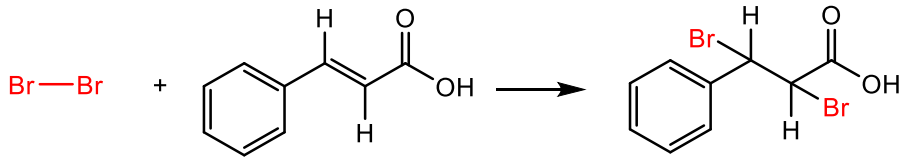


- Disappearance of red color reflects removal of Bromine
- Now we can continue the workup to obtain our products

Lab: Bromine Addition to Alkenes

General Idea:



Chemicals:

Chemicals	Appearance	MW (g/mol)	Equivalent	Amount	Note
Bromine	Dark red liquid In a 1M DCM solution	159.8	1	0.8 mL (0.8 mmol)	Dangerous, volatile, BP: 58°C D: 3.11 g/mL
Cinnamic acid	White crystalline	148.15	1	0.1 g (0.63 mmol)	Not hazardous
Dibromohydrocinnamic acid	White powder	307.97	1		Causes skin irritation
Solvent DCM	liquid				BP 39.6°C
Quench Heptene	liquid				

Lab: Bromine Addition to Alkenes

Glassware/equipment :

Quenching Reagents

- How?
  - Treat the reaction mixture with a compound that the reagent of interest will completely react with
    - Need to keep solubilities in mind:
      - If we use a compound to quench, it needs to be soluble in the reaction solvent
      - If we use a solution to quench, the reagent to quench needs to be soluble in this solution
  - In this case, Bromine is an oxidant so we want to add something that can be oxidized by bromine (a reductant)

Determining Products Using Melting Points

- If we know the potential products we could make, we can look up the melting point values for each of these compounds (the lit values)
  - Ideally, the melting points for each product will be very different (why?)
- We can take a melting point of our unknown and compare it to these values to determine our unknown
- If we did a good job purifying and drying our compound, it will be right within the ranges of the lit values.
- Impurities will LOWER the melting point so impure/ wet products will have melting points below the ranges of the pure products
  - If the compound is very impure or if the melting point ranges for two pure products are close, our experimental melting points may indicate the wrong products

Determining Products Using Melting Points

- 3 mechanisms → 3 predicted outcomes
- What are the melting points for the 2 pure compounds?
- What would the melting point be for a mixture of both compounds?
- Which mechanism predicts which melting point?