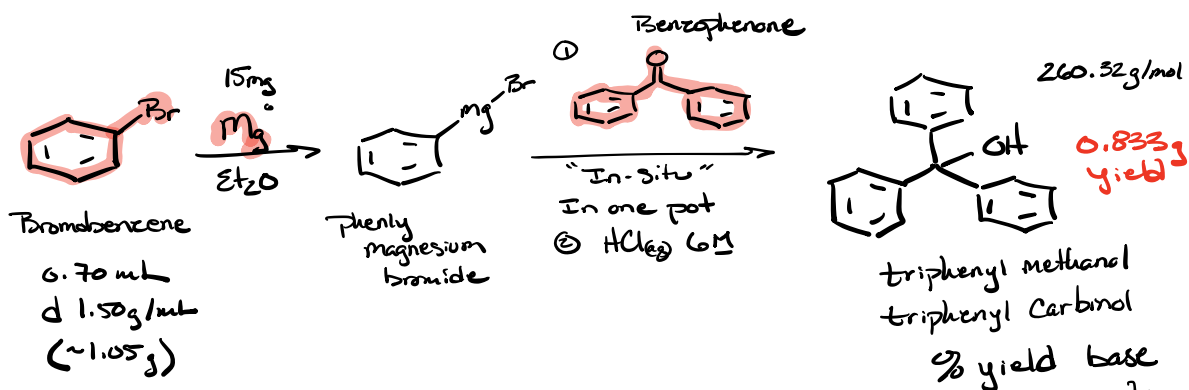


# Formal Reports



\* measurements in the procedure from Paria actual measurements in video will be different



1.05 g

How many moles?

C<sub>6</sub>H<sub>5</sub>Br

$$6 \times 12.01 + 5 \times 1.00794 + 79.904 = 157.01 \text{ g/mole}$$

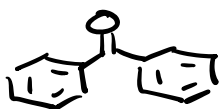
$$1.05 \text{ g} \times \frac{1 \text{ mole}}{157.01 \text{ g}} \times \frac{1000 \text{ mmol}}{1 \text{ mole}} = 6.687 \text{ mmol}$$

most small scale chemistry is 0.5 mmol - 10 mmol  
often 1-2 mmol scale.

Mg 0.15 g

24.305 g/mole

$$0.15 \text{ g} \times \frac{1 \text{ mole}}{24.305 \text{ g}} \times \frac{1000 \text{ mmol}}{1 \text{ mole}} = 6.160 \text{ mmol}$$



$$13 \times 12.01 + 10 \times 1.00794 + 15.9994 \\ = 182.23 \text{ g/mole}$$

$$1.09 \text{ g} \times \frac{1 \text{ mole}}{182.23 \text{ g}} \times \frac{1000 \text{ mmol}}{1 \text{ mole}} = 5.981 \text{ mmol}$$

Limiting

Example of % yield calc.

$$\% \text{ yield} = \frac{\text{actual}}{\text{Theoretical}} \times 100$$

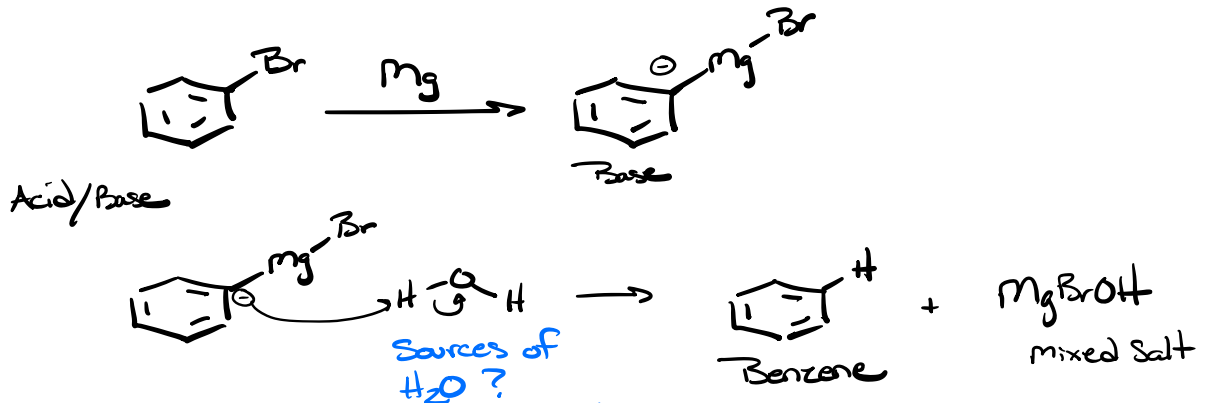
$$= \frac{0.833 \text{ g}}{\quad} \times 100$$

$$\text{Limiting Reagent} \quad \frac{5.981 \text{ mmol}}{4} \times \frac{1 \text{ mol}}{1000 \text{ mmol}} \times \frac{260.32 \text{ g}}{1 \text{ mol}} \times 100$$

Exact

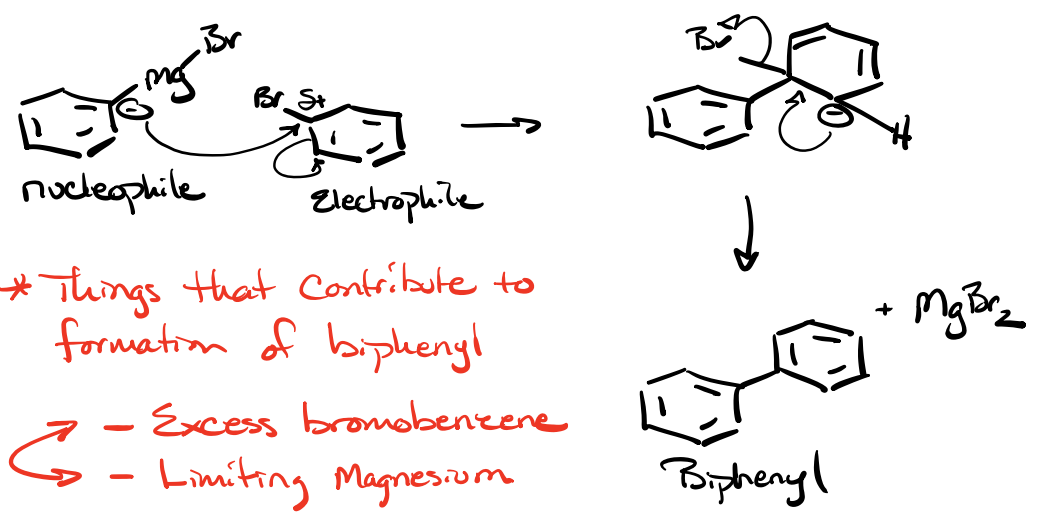
$$= \boxed{53.5 \% \text{ isolated yield}}$$

# Issues w/ Zn. Side products




- dependant on Condensat
- Solvent (Et<sub>2</sub>O) old or Cap off
  - Glassware not fully dried
  - Spin vane
  - ② - Round bottom opened to Smash Mg
  - ① - Syringe could not be dried

## nucleophile/Electrophile (Nucleophilic Aromatic Substitution)



## \* Other places where things can go wrong

- Amounts of Reagents  
Too much, too little
- Reaction gets too hot → boil off  $\text{Et}_2\text{O}$
- Reaction time too short  
→ not enough time for products to form  
→ quench step when reaction opened would produce more  
 from  $\text{H}_2\text{O}$  addition
- Extraction Step with 6M HCl  
→ too much  $\text{H}_2\text{O}$  gets through  
Extraction into organic layer  
⇒ Decrease in yield
- Loss of organic layer in Extraction to aqueous & thrown out  
⇒ Decrease in yield

How do I know if an error occurred?

Mass impure  
Mass Recrystallized  
Compare the two

Recrystallization  
> 80% recovery

⇒ good > 90%

## - Recrystallization

- Temp too low, not at Boiling Point
  - Too much solvent used
  - not fully iced long enough before filtration
- ⇒ Decrease in yield

\* Every time you produce a solid  $\Rightarrow$  Weigh Solid

$\Rightarrow$  Mass balance tracking

$\Rightarrow$  Allows you to see in your steps where error or loss occurs

\* Draft of formal by Monday next week  
9/20

\* Final Formal due two weeks  
9/27