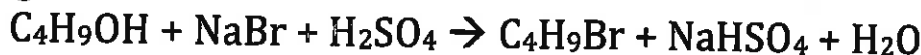


# Challenge Problem

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The reaction of 15.0g  $C_4H_9OH$ , 22.4g  $NaBr$ , and 32.7g  $H_2SO_4$  yields 17.1g  $C_4H_9Br$  in the reaction:



✓ Balanced

Determine the percent yield of the reaction.

$$15.0g C_4H_9OH \left( \frac{1 \text{ mol } C_4H_9OH}{74.14g} \right) = 0.202 \text{ mol } C_4H_9OH$$

$$22.4g NaBr \left( \frac{1 \text{ mol } NaBr}{102.89g} \right) = 0.218 \text{ mol } NaBr$$

$$32.7g H_2SO_4 \left( \frac{1 \text{ mol } H_2SO_4}{98.086g} \right) = 0.333 \text{ mol } H_2SO_4$$

all 1:1  
mol ratio in  
balanced equation  
so the one w/ the  
least mols in L.R.

∴  $C_4H_9OH$  is L.R.

$$15.0g C_4H_9OH \left( \frac{1 \text{ mol } C_4H_9OH}{74.14g} \right) \left( \frac{1 \text{ mol } C_4H_9Br}{1 \text{ mol } C_4H_9OH} \right) \left( \frac{137.03g}{1 \text{ mol } C_4H_9Br} \right) = 27.72g C_4H_9Br$$

theoretical yield

$$\% \text{ yield} = \frac{\text{actual (experimental)}}{\text{theoretical}} (100)$$

$$\% \text{ yield} = \frac{17.1g C_4H_9Br}{27.72g C_4H_9Br} (100) = 62\% \text{ yield}$$