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:

$$C_4H_9OH + NaBr + H_2SO_4 \rightarrow C_4H_9Br + NaHSO_4 + H_2O$$

Balanced ✓

Determine the percent yield of the reaction.

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

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

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

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

∴ C_4H_9OH is L.R.

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

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

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