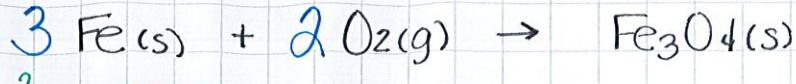


Expanding Stoichiometry Again

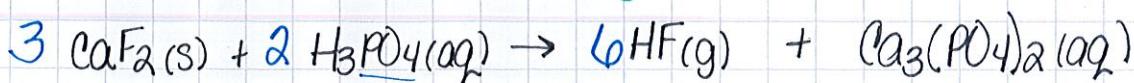


What mass of Fe₃O₄ can be produced from the reaction of 100.0 g of iron w/ excess oxygen?
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<u>100.0 g Fe</u>	<u>1 mol Fe</u>	<u>1 mol Fe₃O₄</u>	<u>231.55 g Fe₃O₄</u>	<u>{ 138.2 g Fe₃O₄</u>
	<u>55.85 g Fe</u>	<u>3 mol Fe</u>	<u>1 mol Fe₃O₄</u>	

MM Fe $3 \times 55.85 \text{ g} = 167.55 \text{ g}$
 O $4 \times 16.00 \text{ g} = 64.00 \text{ g}$
+ 231.55 g

Theoretical yield - the amount of product that can theoretically be made by doing stoichiometry.



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If 4.50 g CaF₂ are reacted w/ excess phosphoric acid, how many grams of hydrofluoric acid are produced?

<u>4.50 g CaF₂</u>	<u>1 mol CaF₂</u>	<u>6 mol HF</u>	<u>20.01 g HF</u>	<u>{ 2.31 g HF</u>
	<u>78.08 g CaF₂</u>	<u>3 mol CaF₂</u>	<u>1 mol HF</u>	

MM Ca $1 \times 40.08 \text{ g} = 40.08 \text{ g}$
 F $2 \times 19.00 \text{ g} = 38.00 \text{ g}$
78.08 g

MM HF $1 \times 1.01 \text{ g} = 1.01 \text{ g}$
 F $1 \times 19.00 \text{ g} = 19.00 \text{ g}$
20.01 g

What is the theoretical yield of calcium phosphate in the problem above?

<u>4.50 g CaF₂</u>	<u>1 mol CaF₂</u>	<u>1 mol Ca₃(PO₄)₂</u>	<u>310.18 g</u>	<u>{ 5.96 g</u>
	<u>78.08 g CaF₂</u>	<u>3 mol CaF₂</u>	<u>1 mol Ca₃(PO₄)₂</u>	

MM Ca₃(PO₄)₂ $3 \times 40.08 \text{ g} + 2 \times 310.18 \text{ g} = 5.96 \text{ g}$

If you actually produced 4.03 g Ca₃(PO₄)₂ in lab, what is the % yield?

$$\% \text{ yield} = \frac{\text{actual yield}}{\text{theoretical yield}} \times 100 = \frac{4.03 \text{ g}}{5.96 \text{ g}} \times 100 = 67.6 \%$$