

Calculate how many grams of acrylonitrile could be obtained from 651 kg of propylene, assuming there is excess NO present.

- 1 - Convert mass propylene to moles using formula weight (and metric prefix kilo-)
- 2 - Convert moles propylene to moles acrylonitrile using chemical equation
- 3 - Convert moles acrylonitrile to grams using formula weight.

$$42.081 \text{ g C}_3\text{H}_6 = \text{mol C}_3\text{H}_6 \quad \text{kg} = 10^3 \text{ g} \quad 4 \text{ mol C}_3\text{H}_6 = 4 \text{ mol C}_3\text{H}_3\text{N}$$

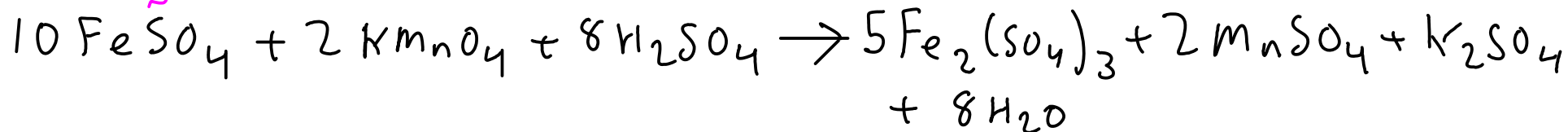
$$53.064 \text{ g C}_3\text{H}_3\text{N} = \text{mol C}_3\text{H}_3\text{N}$$

$$651 \text{ kg C}_3\text{H}_6 \times \frac{10^3 \text{ g}}{\text{kg}} \times \frac{\text{mol C}_3\text{H}_6}{42.081 \text{ g C}_3\text{H}_6} \times \frac{4 \text{ mol C}_3\text{H}_3\text{N}}{4 \text{ mol C}_3\text{H}_6} \times \frac{53.064 \text{ g C}_3\text{H}_3\text{N}}{\text{mol C}_3\text{H}_3\text{N}} =$$

①
②
③

$$= 821000 \text{ g C}_3\text{H}_3\text{N}$$

151.90 g/mol



How many mL of 0.250M potassium permanganate are needed to react with 3.36 g of iron(II) sulfate?

- 1 - Convert mass of iron(II) sulfate to moles using formula weight.
- 2 - Convert moles iron(II) sulfate to moles potassium permanganate using chemical equation
- 3 - Convert moles potassium permanganate to volume using concentration (0.250 M)

$151.90 \text{ g FeSO}_4 = \text{mol FeSO}_4$	$10 \text{ mol FeSO}_4 = 2 \text{ mol KMnO}_4$	$0.250 \text{ mol KMnO}_4 = \text{L}$
---	--	---------------------------------------

$\text{mL} = 10^{-3} \text{ L}$

$$3.36 \text{ g FeSO}_4 \times \frac{\text{mol FeSO}_4}{151.90 \text{ g FeSO}_4} \times \frac{2 \text{ mol KMnO}_4}{10 \text{ mol FeSO}_4} \times \frac{\text{L}}{0.250 \text{ mol KMnO}_4} \times \frac{\text{mL}}{10^{-3} \text{ L}} =$$

①
②
③

$$= \boxed{17.7 \text{ mL}} \text{ (of } 0.250 \text{ M KMnO}_4\text{)}$$