42.081 g/mol 53.064 g/mol

$$4\,C_3H_6 + 6\,NO \longrightarrow 4\,C_3H_3N + 6\,H_2O + N_2$$

propylene acrylonitrile

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

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1 - Convert 651 kg propylene to moles. Use FORMULA WEIGHT (and kg->g conversion)
2 - Convert moles propylene to moles acrylonitrile using CHEMICAL EQUATION
3 - Convert moles acrylonitrile to mass. Use FORMULA WEIGHT

$42.081\ g\ C_3H_6 = 1\ mol\ C_3H_6$ | $4\ mol\ C_3H_6 = 4\ mol\ C_3H_3N$

$53.064\ g\ C_3H_3N = 1\ mol\ C_3H_3N$ | $1\ kg = 10^3\ g$

$$651\ kg\ C_3H_6 \times \frac{10^3\ g}{1\ kg} \times \frac{1\ mol\ C_3H_6}{42.081\ g\ C_3H_6} \times \frac{4\ mol\ C_3H_3N}{4\ mol\ C_3H_6} \times \frac{53.064\ g\ C_3H_3N}{1\ mol\ C_3H_3N} =$$

① ② ③

$$= 821000\ g\ C_3H_3N \quad (821\ kg)$$

151.90 g/mol

$$10\,FeSO_4 + 2\,KMnO_4 + 8\,H_2SO_4 \rightarrow 5\,Fe_2(SO_4)_3 + 2\,MnSO_4 + K_2SO_4 + 8\,H_2O$$

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

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1 - Convert 3.36 g iron(II) sulfate to moles. Use FORMULA WEIGHT
2 - Convert moles iron(II) sulfate to moles potassium permangenate. Use CHEMICAL EQUATION
3 - Convert moles potassium permangenate to volume. Use MOLAR CONCENTRATION

151.90 g $FeSO_4$ = mol $FeSO_4$	10 mol $FeSO_4$ = 2 mol $KMnO_4$
0.250 mol $KMnO_4$ = L	mL = 10^{-3} L

$$3.36\,g\,FeSO_4 \times \frac{mol\,FeSO_4}{151.90\,g\,FeSO_4} \times \frac{2\,mol\,KMnO_4}{10\,mol\,FeSO_4} \times \frac{L}{0.250\,mol\,KMnO_4} \times \frac{mL}{10^{-3}\,L} =$$

(1) (2) (3)

$$= 17.7\,mL\ of\ 0.250\,M\ KMnO_4$$