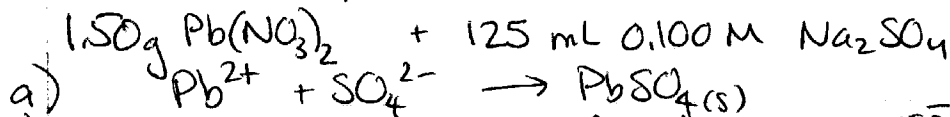


Additional Problem - Ch. 4

Answer



b) $(1.50 \text{ g Pb(NO}_3)_2) \left(\frac{1 \text{ mol Pb(NO}_3)_2}{331.22 \text{ g Pb(NO}_3)_2} \right) = 0.0045287 \text{ mol Pb(NO}_3)_2$
 $= 0.0045287 \text{ mol Pb}^{2+}$

$(0.125 \text{ L}) \left(\frac{0.100 \text{ mol Na}_2\text{SO}_4}{\text{L}} \right) = 0.0125 \text{ mol Na}_2\text{SO}_4$
 $= \times 2 = 0.0250 \text{ mol Na}^+$
 and $0.0125 \text{ mol SO}_4^{2-}$

Need $\frac{1 \text{ Pb}^{2+}}{1 \text{ SO}_4^{2-}}$ Have $\frac{0.0045287 \text{ mol Pb}^{2+}}{0.0125 \text{ mol SO}_4^{2-}} = \frac{0.362 \text{ Pb}^{2+}}{1 \text{ SO}_4^{2-}}$ not enough Pb²⁺ SO₄²⁻
 (Pb²⁺ is LR)

c) V_{total} in this problem = 0.125 L
 Pb²⁺ gets used up $[Pb^{2+}] = 0 \text{ M}$
 some SO₄²⁻ gets used up

$(0.0045287 \text{ mol Pb}^{2+}) \left(\frac{1 \text{ mol SO}_4^{2-}}{1 \text{ mol Pb}^{2+}} \right) = 0.0045287 \text{ mol SO}_4^{2-} \text{ used up}$

$0.0125 \text{ mol SO}_4^{2-} \text{ start} - 0.0045287 \text{ mol used} = 0.0079713 \text{ mol SO}_4^{2-} \text{ left}$
 4 dec places 5 dec places need 4 dec places (now it's 2 sf)

$[SO_4^{2-}] = \frac{0.0079713 \text{ mol}}{0.125 \text{ L}} = 0.06377 \text{ M} = 0.064 \text{ M SO}_4^{2-}$

spectator ions - do not get used up.

$[NO_3^-] = \frac{0.0090574 \text{ mol}}{0.125 \text{ L}} = 0.072459 \text{ M} = 0.0725 \text{ M NO}_3^-$

$[Na^+] = \frac{0.0250 \text{ mol}}{0.125 \text{ L}} = 0.200 \text{ M Na}^+$