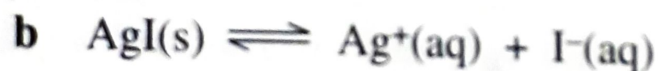


reaction vessel for further oxidation to the acid.
A = correct conditions, **M** = 4 correct explanation

Test yourself 10A

- 1 a $\text{SrF}_2(\text{s}) \rightleftharpoons \text{Sr}^{2+}(\text{aq}) + 2\text{F}^{-}(\text{aq})$
b $s = 0.012 \text{ g per } 100 \text{ g of water}$
 $= 0.12 \text{ g L}^{-1}$
 $= 9.6 \times 10^{-4} \text{ mol L}^{-1}$
c $[\text{Sr}^{2+}] = 9.6 \times 10^{-4} \text{ mol L}^{-1}$, $[\text{F}^{-}] = 2 \times 9.6 \times 10^{-4} \text{ mol L}^{-1}$
d $K_s = [\text{Sr}^{2+}][\text{F}^{-}]^2$
 $= [9.6 \times 10^{-4}][2 \times 9.6 \times 10^{-4}]^2$
 $= 3.5 \times 10^{-9}$

- 2 a $M(\text{AgI}) = 234.77 \text{ g mol}^{-1}$
solubility $= \frac{2.8 \times 10^{-6} \text{ g L}^{-1}}{234.77 \text{ g mol}^{-1}}$
 $= 1.19 \times 10^{-8} \text{ mol L}^{-1}$



c $K_s = [\text{Ag}^{+}][\text{I}^{-}]$

d $[\text{Ag}^{+}] = [\text{I}^{-}] = 1.19 \times 10^{-8}$

$$K_s = (1.19 \times 10^{-8})^2$$

$$= 1.4 \times 10^{-16}$$

- 3 a $\text{PbBr}_2(\text{s}) \rightleftharpoons \text{Pb}^{2+}(\text{aq}) + 2\text{Br}^{-}(\text{aq})$

Test yourself 10B



$$\begin{aligned} [\text{Ca}^{2+}] = [\text{SO}_4^{2-}] &= \frac{10 \text{ mL}}{20 \text{ mL}} \times 0.001 \text{ mol L}^{-1} \\ &= 5 \times 10^{-4} \text{ mol L}^{-1} \end{aligned}$$

$$\begin{aligned} \text{Ionic product} &= [\text{Ca}^{2+}][\text{SO}_4^{2-}] \\ &= (5 \times 10^{-4})^2 \\ &= 2.5 \times 10^{-7} \end{aligned}$$

Ionic product $< K_s$ so no precipitate will form.

2 a $[\text{Pb}^{2+}] = 0.025 \text{ mg L}^{-1}$

$$\begin{aligned} &= 2.5 \times 10^{-5} \text{ g L}^{-1} \\ &= \frac{2.5 \times 10^{-5} \text{ g L}^{-1}}{207.2 \text{ g mol}^{-1}} \\ &= 1.2 \times 10^{-7} \text{ mol L}^{-1} \end{aligned}$$

b $[\text{Pb}^{2+}] = \frac{9 \text{ mL} \times 1.2066 \times 10^{-7} \text{ mol L}^{-1}}{(9 \text{ mL} + 1 \text{ mL})}$

$$= 1.1 \times 10^{-7} \text{ mol L}^{-1}$$

c $[\text{CrO}_4^{2-}] = \frac{1 \text{ mL} \times 0.100 \text{ mol L}^{-1}}{(9 \text{ mL} + 1 \text{ mL})}$

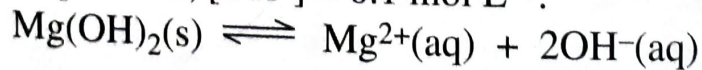
$$= 0.0100 \text{ mol L}^{-1}$$

d $\text{IP} = [\text{Pb}^{2+}][\text{CrO}_4^{2-}]$

$$\begin{aligned} &= (1.1 \times 10^{-7} \text{ mol L}^{-1})(0.0100 \text{ mol L}^{-1}) \\ &= 1.1 \times 10^{-9} \text{ mol L}^{-1} \end{aligned}$$

$\text{IP} > K_s$ so precipitation will occur

3 At pH = 13, $[\text{OH}^-] = 0.1 \text{ mol L}^{-1}$.



$$K_s = [\text{Mg}^{2+}][\text{OH}^-]^2$$

$$\frac{K_s}{[\text{OH}^-]^2} = [\text{Mg}^{2+}]$$

$$\frac{1 \times 10^{-11}}{(0.1)^2} = [\text{Mg}^{2+}]$$

$$1 \times 10^{-9} \text{ mol L}^{-1} = [\text{Mg}^{2+}]$$