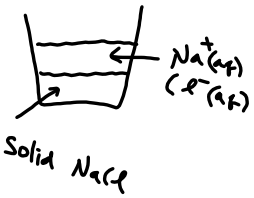
Solubility Equilibrium-Ksp



$NaCl_{(s)} \rightleftharpoons Na^+_{(aq)} + Cl^-_{(aq)}$

- Stress $[Cl^-]\uparrow$
- Shift to reactants
- More Solid NaCl.

Animation-

Deriving Ksp Expression

Recall- $NaCl_{(s)} \rightleftharpoons Na^+_{(aq)} + Cl^-_{(aq)}$ very soluble

$AgCl_{(s)} \rightleftharpoons Ag^+_{(aq)} + Cl^-_{(aq)}$ heterogeneous equil.

Write K_{eq} Expression

constant → $K_{eq} = \frac{[Ag^+][Cl^-]}{[AgCl]}$ ← solid [ ] is constant

$K_{eq} \cdot [AgCl] = [Ag^+][Cl^-]$

new constant → $K_{sp} = [Ag^+][Cl^-]$

1.8×10^{-10}

Lab-Measuring Ksp for $Ca(OH)_2$

1. $Ca(OH)_{2(s)} \rightleftharpoons Ca^{2+}_{(aq)} + 2(OH^-)_{(aq)}$
2. $K_{sp} = [Ca^{2+}] \cdot [OH^-]^2$
3. Why measure $[OH^-]$ only?

Data

Trial 1.

$Ca(OH)_2$

Mass before ____ g

- Mass after ____ g

Mass Used ____ g (mL)

HCl

Mass Before ____ g

- Mass After ____ g

Mass Used ____ g (mL)

Ksp Lab Calculations

1. Moles HCl used- $[HCl] = 0.050\ mol/L$

$0.30\ mL \times \frac{1.00\ L}{1000\ mL} = 0.0003\ L$

$0.0003\ L \times \frac{0.050\ mol\ HCl}{1\ L} = 1.5 \times 10^{-5}\ mol\ HCl$

Ksp Lab Calculations Continued