

7.3 Reactions in Solution

Definitions

- Total ionic equations
- Spectator
- Net ionic equation
- (aq)
- Collision theory
- Solubility tables

Disassociation

- Soap scum (calcium stearate) is difficult to remove. We need a cleaning product that disassociates the molecule into soluble ions that can be rinsed away.
- The production and removal of precipitates is a very important process to chemistry. Soap is a precipitate and many cleaning supplies are used to remove precipitates.

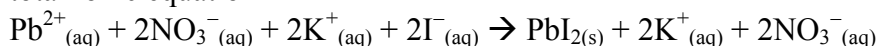
Collision Theory

- A chemical system consists of *particles* (atoms, ions, or molecules) that are in constant random motion at various speeds. The average kinetic energy of the particles is proportional to the temperature of the sample.
- A chemical reaction must involve *collisions of particles* with each other or the walls of the container.
- An *effective collision* is a collision between particles that has sufficient energy and correct orientation (alignment or positioning) of the colliding particles so that bonds can be broken and new bonds formed.
- *Ineffective collisions* involve particles that rebound from the collision, essentially unchanged in nature.

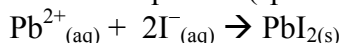
Net Ionic Equations

- Arrhenius theory of dissociation can be used to determine a reaction.
- E.g. balanced chemical equation
$$\text{Pb}(\text{NO}_3)_{2(\text{aq})} + 2 \text{KI}_{(\text{aq})} \rightarrow \text{PbI}_{2(\text{s})} + 2 \text{KNO}_{3(\text{aq})}$$

total ionic equation



net ionic equation (spectators from the above reaction are removed)



Summary from Textbook

- Write the balanced chemical equation with full chemical formulas for all reactants and products.
- Using solubility information, such as the table in Appendix C, rewrite the formulas for all high-solubility ionic compounds as dissociated ions, to show the total ionic equation.
- Cancel identical amounts of identical entities appearing on both reactant and product sides.
- Write the net ionic equation, reducing coefficients if necessary.

Homework

- Practice 1-8
- Section 1-3