

15.3 Effect of Temperature on the reactivity of magnesium in water

Subject: Equilibrium, kinetics

Description: Magnesium is placed in cold and hot water. The magnesium will not visibly react with the cold water, but will in hot water, producing magnesium hydroxide. The formation of the hydroxide can be illustrated using universal indicator.

Materials:

Magnesium metal

Two 250ml beakers

Water

Hot plate*

Universal indicator or phenolphthalein‡

‡Universal indicator and phenolphthalein are located in the flammables cabinet.

*Shared item: Located in the top drawer of the center bench opposite the chemical storage cabinets or on the central bench.

Procedure:

Note: Use the demo camera to project the reaction to the class.

1. Add water to one of the beakers and heat on the hot plate. Add indicator.
2. Add water and indicator to a beaker with cold water.
2. Place a piece of magnesium metal in the cold and hot water beakers.
3. The magnesium in the cold water won't react, but the magnesium in hot water will react to produce magnesium hydroxide.
4. Magnesium hydroxide is weakly basic. The indicator will change color to show the presence of magnesium hydroxide.

Discussion:

Increasing temperature increases the rate of reaction. The reaction between magnesium and cold water is very slow. Magnesium reacts with hot water much faster to produce magnesium hydroxide and hydrogen gas.



Magnesium hydroxide is insoluble in water and is slightly basic, which reacts with the universal indicator, turning the solution blue/green or with the phenolphthalein turning the solution pink.

Safety: None

Disposal: Dilute acid can be used to clean-up the solution and can be flushed down the drain with water.

References: None