

### 14.4 Affect of Temperature on a light stick reaction

**Subject:** Kinetics, chemiluminescence

**Description:** A chemical light stick is placed in an ice bath and in hot water. The difference in the brightness of the light reaction is observed.

**Materials:**

2 Light sticks

2 500 mL beakers

ice bath or liquid nitrogen (order ahead of time)

hot plate\*

water

thermometer (optional)

Dewar (if using liquid nitrogen – located on the shelf in the alcove)

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

**Procedure:**

**Note:** Use the document camera for larger rooms.

1. Dim the lights in the room for better visualization.
2. Follow the packet instructions for activating the light stick.
3. Place the light stick in the ice bath or liquid nitrogen. The intensity of the light stick will diminish as the contents cool. If using liquid nitrogen, the light will extinguish after several minutes of being immersed.
4. Place the light stick in hot water. The intensity will increase. Be careful not to melt the plastic. The hot water should not be boiling.

**Discussion:**

This demonstration investigates the affect of temperature on the rate of a reaction; specifically the reaction taking place in a light stick. As observed, placing the light stick in cold water diminishes the intensity of the light and placing the light stick in hot water increases the intensity of the light stick.

**Safety:** None

**Disposal:** Dispose of used light sticks in the trash.

**References:**

1. B.Z. Shakhashiri; *Chemical Demonstrations: A Handbook for Teachers of Chemistry*. Wisconsin; 1983; Volume 1; p. 146-151