CO₂ in Aqueous Solutions

Description: CO₂ (s) is added to an aqueous solution containing an acid-base indicator.

Materials:

- Universal Indicator
- 1-L graduated cylinder
- 3.0 M HCl
- Dry Ice
- 3.0 M NaOH

Procedure:

1. Dilute 5 mL of 3.0 M NaOH with 650 mL of water. Add 10 mL of Universal Indicator to this. The solution should be purple.

2. Display with lights on or turn lights off and place graduated cylinder on top of document camera station with the base lights on. Drop in small chunks of dry ice. Color will change from purple to blue to yellow-orange. Addition of a few drops of 3.0 M HCl will turn the solution red. Colors can oscillate back and forth by addition of acid/base.

Discussion: Addition of CO₂ (s) produces carbonic acid which decreases the pH of solution and causes the orange color change. For other variations of this demonstration, reference the Shakhashiri text.

Safety: Wear proper protective equipment including gloves and safety glasses when preparing and performing this demonstration. Concentrated solutions of acids and bases (>2 M) can irritate the skin and cause burns. Vapors of concentrated acids are extremely irritating to the eyes and respiratory system. When diluting concentrated acids, add the acid to the water to avoid spattering. Avoid contacting skin with dry ice by using insulated gloves or tongs.

Disposal: Materials can be flushed down the drain with plenty of water.

References:


Video:

http://www.youtube.com/watch?v=dx5FZ9ATw9M (lights out)

http://www.youtube.com/watch?v=GuGrkPdvRFM