

## Electrolysis of Water

### Purpose

To show the electrolysis of water, the ratio of  $\text{H}_2$  and  $\text{O}_2$  produced and the pH of the solutions at the electrodes.

### Materials

electrolysis apparatus or ring stand

0.1 M  $\text{K}_2\text{SO}_4$  or  $\text{Na}_2\text{SO}_4$

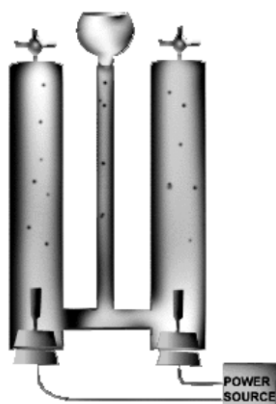
electric leads

universal indicator

power source (battery)

### Procedure

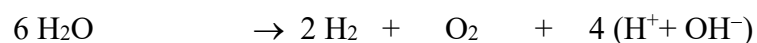
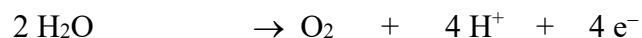
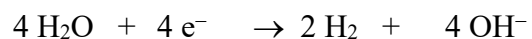
1. Set-up the electrolysis apparatus as shown:



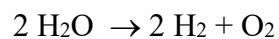
2. Add solution to apparatus. Be sure to open stopcocks before filling. Fill to remove all the bubbles from both side columns. Close stopcocks.
3. Be sure that the central reservoir is not completely full.
4. Add several drops of universal indicator.
5. Attach leads to power source. Allow the apparatus to run for 10-15 minutes to produce plenty of  $\text{H}_2$  and  $\text{O}_2$  and show indicator changes.

### Additional Information

1. H<sub>2</sub> and O<sub>2</sub> gases may be collected in inverted test tubes. The H<sub>2</sub> can be ignited with a burning splint to produce a whistling sound. If a glowing splint is inserted into the O<sub>2</sub> tube, it will burst into flame.
2. The reactions are:



Net



### Questions for the Students

1. What are the two gases?
2. Which gas is at which electrode?
3. Write a balanced equation for electrolysis of water.

### Disposal

The solution in the apparatus can be re-used. Once the demo is complete, return the solution to the original container.

Solution in container may grow mold. If this happens, simply make a fresh batch of the solution.

### Reference

University of Illinois, Urbana-Champaign.