

## DEMOS

# Genie

### Materials

1 L round bottomed flask or Genie Lamp, 30% hydrogen peroxide, manganese dioxide, tissue, thread.

### Introduction

Hydrogen peroxide is decomposed catalytically into water.

### Procedure

Place a small amount of manganese dioxide on a piece of tissue paper, and tie with a string to make a small sack. Cut off excess paper.

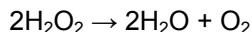
Place 50 mL of hydrogen peroxide into your container. Place the sack of manganese dioxide into the container and use a stopper to hold the string so that the sack does not fall into the liquid. Remove the stopper.

Do you see a genie?

Did you *really* see a genie?...What did you really see?

### The Chemistry

The reaction is the catalytic decomposition of hydrogen peroxide:



The 'genie' is actually a fog of condensing water vapor mixed with oxygen gas. Oxygen is a colorless, odorless gas at room temperature and atmospheric pressure. The discovery of oxygen is typically attributed to Joseph Priestly. However, it was Lavoisier who first realized this gas was a unique component of air. Here oxygen is formed from the decomposition of hydrogen peroxide.

Hydrogen peroxide is not a very stable compound and its decomposition can be induced by light and catalysts. Light will decompose it, which is why it is sold in brown bottles in drugstores. The surface of manganese dioxide provides a particularly favorable environment to catalyze the decomposition.

Repeat with 6 % peroxide to show the production of oxygen and the oxygen test.

### Safety

Safety goggles and protective gloves must be worn. 30 % hydrogen peroxide is caustic to skin and eyes. Manganese dioxide is a strong oxidant, avoid inhalation and contact with organic material. The chemical waste from this demo can be washed down the drain.

### References

Shakhashiri, B.Z. (1989) *Chemical Demonstrations, A Handbook for Teachers of Chemistry*, Wisconsin, Vol.2, pp. 137-141.