

Vomiting Pumpkin Performer's Version

Safety Hazards

- Personal Protective Equipment:
 - Safety glasses/goggles
 - Nitrile gloves
 - Chemical & flame retardant lab coat
- Physical Hazards:
 - Extremely exothermic and may cause skin burns.
 - Hydrogen peroxide is extremely flammable and may intensify fire.
- Chemical Hazards:
 - Hydrogen peroxide is harmful if swallowed or inhaled and may irritate skin and eyes.
 - Potassium iodide causes damage to thyroid through

prolonged and repeated exposure.

Materials

- Pre-carved pumpkin
- Small plastic bowl
- 30% hydrogen peroxide
- Potassium iodide (solid)
- Deionized water
- Dawn dish soap
- Food coloring

Safety Data Sheet(s)

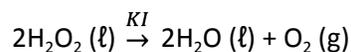
- [Potassium iodide](#)
- [Hydrogen peroxide](#)

Procedure

1. Place your pre-carved pumpkin in the center of the table and place the plastic bowl inside.
2. Pour the entire aliquot of 30% hydrogen peroxide into the plastic bowl.
3. Add the dish soap to the plastic bowl. Gently swirl the liquids to mix them.
4. Add several drops of your desired food coloring.
5. Pour the correct volume of deionized water into the container of solid potassium iodide. Tightly close the lid and shake vigorously. The bottle should feel cold to the touch.
6. When you are ready and the potassium iodide seems fully dissolved, hold the lid of the pumpkin in one hand and pour the entire potassium iodide solution into the plastic bowl and quickly close the lid of the pumpkin and hold it down firmly. Keep your face back and out of the way. As the hydrogen peroxide decomposes, oxygen gas is released and transforms the soapy solution to a colored foam that will expand rapidly out of the pumpkin's mouth.

Pedagogy/Chemical Info

The catalyzed decomposition of 30% hydrogen peroxide, showcased in the Elephant's Toothpaste demonstration, is a visually striking chemical reaction. This reaction typically involves the addition of a catalyst, such as potassium iodide, to accelerate the decomposition of hydrogen peroxide into water and oxygen gas. This process releases a large volume of oxygen gas, causing the characteristic foamy eruption seen in the Elephant's Toothpaste demonstration. The catalyzed decomposition of hydrogen peroxide can be expressed as the below reaction:



Beyond its spectacular use in demonstrations, the catalyzed decomposition of hydrogen peroxide has several practical applications in the real world. One of the most prominent applications is in the field of rocketry. Hydrogen peroxide can be used as a propellant in rockets, and its decomposition provides the necessary oxygen for combustion. By adding a catalyst, such as potassium iodide, the decomposition process can be controlled and accelerated, making it suitable for propulsion systems in rockets and missiles.

Additionally, this reaction finds application in the manufacturing of various products. It is used in the production of foam plastics, where the rapid release of oxygen gas helps create the desired foam structure. The reaction is also utilized in wastewater treatment plants to efficiently break down organic contaminants. Furthermore, it plays a role in certain medical and dental applications, such as teeth whitening products and antiseptic solutions, where hydrogen peroxide serves as a disinfectant or bleaching agent. Overall, the catalyzed decomposition of hydrogen peroxide has diverse applications across industries, from aerospace to healthcare, owing to its ability to generate oxygen gas rapidly and efficiently in controlled environments.