

# Modified Piezoelectric Igniter

## Introduction

The piezoelectric igniter is a piece of equipment used to ignite gases. It plays an important role in igniting propane or natural gas to start up a grill. With a few modifications, a piezoelectric igniter can be used to ignite small amounts of gases (hydrogen and oxygen) that have been collected in microscale “bulb rockets.”

## Concepts

- Piezoelectric effect
- Combustion reaction

## Materials

Copper wire, insulated, 22 cm

Tape, electrical

Piezoelectric igniter

Tape, transparent

## Safety Precautions

*Exercise care when using the piezoelectric igniter—do not touch the bare copper wire on the side of the igniter. Wrap the body of the modified igniter with electrical tape before use.*

## Procedure

1. Cut two pieces of insulated copper wire, about 10 cm and 12 cm, respectively. Strip about 1.5 cm of insulation the end of the shorter wire and about 1 cm off the end of the longer wire (Figure 1).
2. Curl the 1.5 cm end of bare wire around a pencil to make a small, tight coil. Insert the coil around the metal post in the center of the piezoelectric igniter (Figure 2).
3. Line up the bare wire end of the second piece of insulated wire directly on top of the bare copper wire that runs down the side of the piezoelectric igniter (Figure 3). Using transparent tape, tape the stripped wire to the copper wire on the piezoelectric igniter as shown.
4. Line up the two pieces of insulated wire and tape them together just above the metal post (Figure 4).
5. Cut the insulated ends of the two pieces of wire so they are the same length. Tape the insulated ends together so there is only a small “spark gap” between the wires (Figure 5). This is the sparking portion of the modified igniter.
6. Wrap the body of the igniter with electrical tape for safety.

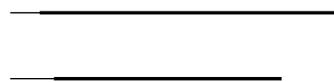


Figure 1.

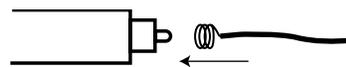


Figure 2.

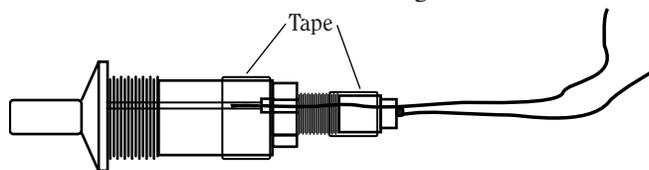


Figure 3.

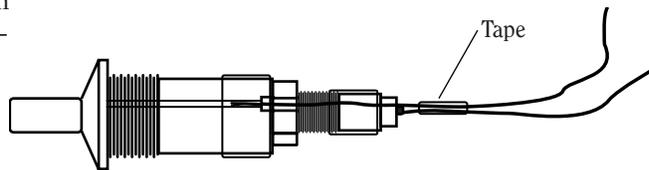


Figure 4.

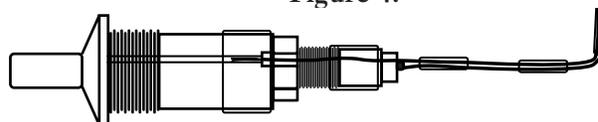


Figure 5.

*(Wrap with electrical tape when done.)*

## Disposal

Save the modified piezoelectric sparker for future use.

## Tip

- The modified piezoelectric igniter may be used to ignite microscale amounts of gases and to launch bulb “rockets” prepared in plastic pipet bulbs. See the experiments “Micro Mole Rockets” in *Molar Relationships and Stoichiometry* and “Microscale Electrolysis” in *Electrochemistry*, Volumes 7 and 17, respectively, in the *Flinn ChemTopic™ Labs* series.

## Discussion

The piezoelectric effect refers to the creation of electrical energy when a ceramic or plastic is subjected to high pressure. A piezoelectric igniter is used in barbecue-type butane lighters to create a spark that will, in turn, ignite the gas. The spark is created when a spring-driven hammer strikes a piece of ceramic within the igniter. When the ceramic is compressed, a high voltage spark occurs between two metal wires or electrodes. The gap between the two electrodes where the spark occurs is located at the tip of the igniter. In this activity, the igniter is modified by extending the electrodes (metal wires) past the tip of the igniter. The spark in the modified igniter occurs at the ends of the extended wire tips and is therefore more accessible and can be used to reach into small openings, such as the stem of a microscale “bulb rocket.”

## References

Uses for the modified piezoelectric igniter can be found in *Molar Relationships and Stoichiometry*, Volume 7, and *Electrochemistry*, Volume 17, in the *Flinn ChemTopic™ Labs* series.

**Materials for the *Modified Piezoelectric Igniter* are available from Flinn Scientific, Inc.**

Catalog No.	Description
AP6609	Piezoelectric Igniter
AP6011	Electrical Tape
AP4716	PVC-insulated Copper Wire
AP6255	<i>Molar Relationships and Stoichiometry</i> , Vol, 7, <i>Flinn ChemTopic™ Labs</i>
AP6662	<i>Electrochemistry</i> , Vol, 17, <i>Flinn ChemTopic™ Labs</i>

Consult your *Flinn Scientific Catalog/Reference Manual* for current prices.