

Burning Money

Purpose

To illustrate a combustion reaction involving a solution with a low combustion temperature.

Materials

- Paper (\$20.00 bill or piece of white paper towel)
- Isopropyl alcohol, 99%
- (1) 400-mL beaker
- Crucible tongs
- Container of water (to extinguish the burning paper)

Safety

- Read the SDS sheets for all chemicals before using them.
- Wear safety glasses, gloves, and lab coat.
- Alcohol is highly volatile and flammable. Ensure no open flames are present (candle, Bunsen burner).
- Avoid inhalation of alcohol vapors
- Burning drops of alcohol may fall from the bill so ensure the audience is at least 1 meter away.

Procedure

1. Pour 100 mL of water into a 400-mL beaker.
2. Add 100 mL of isopropyl alcohol to the beaker. Stir.
3. Soak the bill or paper towel in the solution and then remove with crucible tongs.
4. Light the bill.
5. Extinguish the paper by waving it in the air or submerging it into a container of water.

Results

- Soaked paper ignites into a blue flame but the paper does not burn.

Follow-up Teaching Notes

- Soaked paper ignites into a blue flame but the paper does not ignite due to its combustion temperature, 232 °C.
- Ethanol and water in a 2 to 1 ratio by volume works as well.

Connections

- Combustion, enthalpy of reaction, flammability.

Extension

- Add some salt to the solution to color the flame and make it more visible. (Ex.: Sodium chloride colors the flame yellow instead of blue).

Disposal/Clean-up

- Unused solution can be stored in a sealed and properly labeled container for reuse.
- Alcohol soaked paper should be rinsed thoroughly with water after using it.