

Catalytic Combustor Demo Kit

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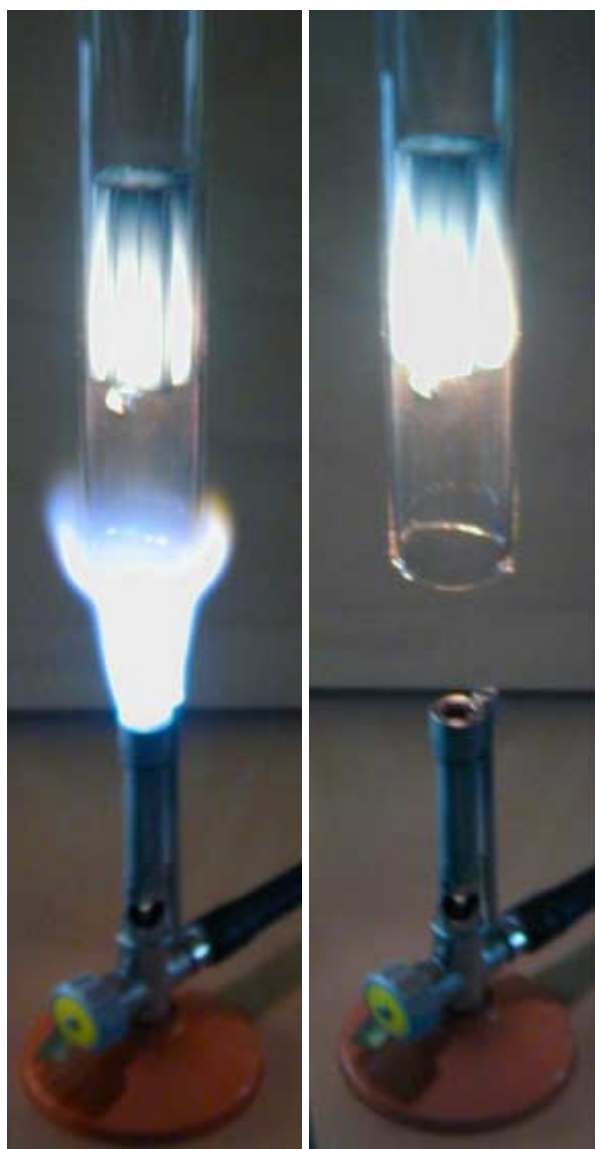
An this demonstration of catalysis, the bottom of a piece of treated ceramic (placed inside of a glass cylinder) is heated to a red-hot glow with the flame of a Bunsen burner or propane torch. When the fuel gas is turned off and then immediately back on, the piece of ceramic continues to glow without evidence of flame. A lit match over the top of the glass tubing is extinguished.

The catalytic combustor consists of a honeycomb shaped block of ceramic whose surfaces have been coated with a proprietary noble metal preparation of platinum or palladium. In operation, the oxidation of the methane or propane fuel occurs on the surface of this metallic catalyst. The red glow of the ceramic indicates that the combustion is occurring at a temperature above 750°C.

Experiment

1. Clamp the top of the Catalytic Combustor unit to a ring stand above (ca. 5-10 cm) a propane torch or Bunsen burner being careful not to damage the glass.
2. Use the flame of the lit torch or burner to gently heat (ca. 30 seconds) the bottom of the glass tubing which holds the Catalytic Combustor unit.
3. Direct the flame to the bottom of the ceramic block until the bottom starts to glow red hot
4. Quickly now, extinguish the flame (usually by momentarily shutting off the gas fuel supply), insert the top of the burner into the bottom of the glass tubing (ca. 1 cm under the treater ceramic block), and turn on the gas fuel supply. The bottom of the ceramic should continue to glow red without evidence of a flame.
5. To demonstrate the complete combustion of the fuel, bring a lit match over the upper tube opening. The flame should go out. Often moisture from the oxidized fuel can be seen collecting on the relatively cooler inside top of the glass tubing.
6. When finished demonstrating, turn off the fuel supply and wait for the unit to cool before disassembling.

Good Experimenting!



The Corning ceramic combustor unit

Commercially, this type of catalytic combustor is found in the exhaust systems of automobiles and in the flue pipes of modern wood burning stoves. Flammable gasses from incomplete combustion are further oxidized on the surface of the treated ceramic. When burning wood or coal this results in less air pollution and more heat. Corning Glass Works estimates that a properly installed catalytic combustor in a wood-burning stove can produce as much as 50% more heat, 90% less creosote and 90% less air pollution. Creosote is a mixture of highly flammable compounds resulting from the incomplete combustion of burning wood. Creosote condenses on cool surfaces and is the cause of many chimney fires. The Corning ceramic combustor unit is designed to operate in a wood burning stove for about 12,000 hours before needing replacement due to poisoning by impurities such as sulphur or lead. These compounds adhere to the catalyst and inhibit oxidation.

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