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## SIMPLE IGNITION FURNACES

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Ignition furnaces which give performance comparable to a blast burner may be easily constructed from simple and economical materials. The first type described uses an ordinary bunsen burner, and the second uses an open jet flame from a blow-pipe or a glass jet.

To construct the first type, the materials needed are one "tin" can of approximately one quart capacity, or smaller, and one pipe-stem triangle. The top of the can is removed entirely. A hole is made in the bottom of the can by making two diagonal cuts, and bending the points in. This hole should be large enough to admit the top of a bunsen burner and leave sufficient opening for draft. The triangle is mounted about the middle of the can by pushing the wires through three equidistant holes punched in the side of the can. This furnace is mounted on an iron ring so that the top of the bunsen burner is just inside the opening of the can.

The second type of furnace is just like the first, except that an additional single piece of pipe-stem is mounted about an inch and a half below the triangle. The purpose of this is to break the flow of gases, and allow the flame to strike the bottom of a crucible when held on the triangle. Otherwise, a mixture of cold gases would strike the bottom of the crucible. The open jet (either a metal blow-pipe or a home-made glass jet) is mounted about two or three inches below the bottom of the furnace. The air-gas mixture is adjusted by raising and lowering the jet. A completely sootless flame is easily produced by proper adjustment.

After ten minutes operation of the first type furnace, a temperature of between 801° and 880° C. was produced within the crucible. This was determined by the fact that sodium chloride (melting point 801° C.) melted, and sodium pyrophosphate (m.p. 880° C.) did not melt. With the open jet furnace, sodium pyrophosphate melted within ten minutes, while potassium carbonate (m.p. 891° C.) did not melt. Actual temperatures obtained would be expected to vary with the type of gas, size of opening in the jet, and the air-gas ratio.

The open jet furnace has been used successfully in place of a blast burner for such ignitions as the gravimetric determination of iron as  $\text{Fe}_2\text{O}_3$ . The bunsen burner furnace has some tendency to sooting unless an unusually large amount of air is admitted to the burner. A higher temperature can be obtained by insulating the furnace with asbestos, or covering it very loosely. Covering the furnace also produces more uniform heating.

Advantages of both types of furnaces are: nominal cost of materials; ease of construction and operation; uniformity of heating; and wide range of temperatures attainable.

