CHEMISTRY

# Make Sun-Hot Flames

Flames that are only some 800 degrees absolute cooler than those on the sun's surface are being produced in the laboratory today from an ozone and cyanogen mixture.

➤ MAN-MADE flames almost as hot as the sun's surface have been achieved by chemical means, an American chemist reported.

The super-hot flames are not mere laboratory curiosities, but are being used in practical testing of high-temperature materials, and some of the super flames will soon be put to practical uses outside the laboratory.

Dr. A. V. Grosse of the Research Institute of Temple University, Philadelphia, described to the 16th International Congress of Pure and Applied Chemistry meeting in Paris, France, flames that have consistently reached temperatures of 8,500 degrees Fahrenheit, or 5,260 degrees on the Absolute scale. The temperature of the sun's surface is approximately 6,000 degrees absolute. Dr. Grosse also predicted the production soon of temperatures of nearly 9,500 degrees Fahrenheit, almost twice the reaction temperature in newer jet engines and over three times the temperature of a blast furnace.

The key to the ultra-high temperatures is in the use of ozone, rather than normal oxygen, in burning hydrogen, cyanogen and other gases. Ozone is an allotropic form of oxygen which occurs in small amounts naturally, but is readily available from commercial suppliers.

A colleague of Dr. Grosse, Dr. A. G. Streng, told SCIENCE SERVICE the hottest flames were produced from ozone-cyanogen mixtures. However, he said, other mixtures producing slightly lower temperatures are more practical.

Charles S. Stokes, a cyanogen flame research chemist and another associate of Dr. Grosse, explained that the cyanogen-oxygen flames, producing temperatures of about 7,700 degrees Fahrenheit, are valuable tools in research on ceramics and other high-temperature materials.

"These flames already are practical outside the laboratory and we have been producing them in large quantities," he said.

The hotter cyanogen-ozone flames, Mr. Stokes said, soon will be practical, routine laboratory tools.

## Chemical Jackpot

➤ A HUGE JACKPOT of undiscovered chemical compounds formed at high temperature offers solutions to the problems of modern technology.

This was the suggestion of Dr. Leo Brewer, a University of California chemist, at the chemists' International Congress.

Dr. Brewer said chemists would come up with many new compounds to help solve the problems of jet aircraft and rockets, atomic energy power plants, space flight and new industrial processes of many kinds.

Materials to withstand tremendous heat are one of the prime needs of the new age.

The reason for relatively slow progress so far is the primitive state of knowledge concerning chemical reactions in the high temperature region of 2,000 to 3,000 degrees centigrade, or from 3,600 to 5,400 degrees Fahrenheit.

The state of knowledge is comparable to that of chemistry at ordinary temperatures a century ago when chemists were trying to learn if water were composed of one atom of hydrogen and one of oxygen, or two hydrogen atoms and one oxygen.

Despite recent work, misconceptions of

TECHNOLOGY

# Luminescent Panels Made

➤ MOTION PICTURES, "erasable" images and movable "pips" have been produced on luminescent panels as flat as a painting and no thicker than a sandwich, it has been announced by Frank J. Healy, vice president in charge of Sylvania Electric Products' lighting operations.

The panels work on two basic principles: "electroluminescence," or making special phosphors glow by exciting them with an alternating electric current field, and "photo-conductivity," a physical property of some substances that allows them to carry an electric current only when light shines on them.

Three types of the "Sylvatron," or image-producing panels, have been developed. One panel makes it possible to move a little dot of light around electrically.

To do this, a layer of electroluminescent phosphor, which might glow any color, is sandwiched between a fine horizontal "grid" of electrically conducting strips only 1/64 inch wide and a similar grid of vertical strips. When electricity is applied to a horizontal and vertical strip, the little "square" between them glows brilliantly. In a two-inch square, 1,024 of these "squares" can be individually lighted.

The second type of panel can not only produce but "store" images for either fractions of a second or hours, if desired. Hundreds of tiny "columns" 1/32 inch square, cemented on electrically conducting glass, combined with electroluminescent and photo-conducting layers, can be individually "triggered" by a spot of light beamed on them. The light image that forms is itself in contact with the photo-conducting layer, and so keeps itself "turned on" until it is erased.

The third type uses one layer each of electroluminescent phosphor, a photo-conductive layer and an electrically conducting layer to turn an ordinary light image focused on the panel into an image made up of thousands of tiny "dots" on the front of the panel. The device can also change infrared light into blue or green light.

The panels can be used as a combination of the types, and have been produced in two-inch and four-inch sizes, but the size is limited only by the size of the production machinery. Development of the panels was at the General Engineering Laboratory of Sylvania's Lighting Division. Part of the work was carried on in cooperation with Lincoln Laboratories of the Massachusetts Institute of Technology.

While the device is still in the laboratory stage, it is considered advanced enough for development and application by electronics and defense laboratories and under military contracts.

As for television, the panels will not be used "in the foreseeable future," Mr. Healy declared, since they are to be restricted right now to military or special commercial uses.

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*SYLVATRON—An image-producing panel is shown being put through laboratory tests by Dr. Keith Butler, manager of the general engineering laboratories of Sylvania's lighting division, Salem, Mass., where the Sylvatron was developed. The unit can convert electrical data into simultaneous dots of light, thus reproducing pictures in motion as shown in the photograph.*