Burn Aluminum Dust for Intense Flame

Chemistry

A flame so intense as to melt its way through any known solid substance is produced by a new type of blowpipe, employing finely powdered aluminum instead of the more familiar hydrogen or acetylene gases. The new invention was described by Dr. Frank M. Strong of Syracuse University, speaking before members of the American Chemical Society at Minneapolis last week.

Dr. Strong described his device as follows:

"A screw conveyer carries a slow stream of aluminum dust from the bottom of a hopper out through the open end of a brass pipe. The dust is here met by a swift cross-stream of oxygen, with which it forms a fine and uniform suspension. From this point the mixture is passed forward through a larger tube, which a little farther along is divided up into eight smaller tubes. The latter diverge from the central tube for a short distance, and are then curved back inward so as to come to a sharp focus. The aluminum-oxygen flame can be lighted at this focus point with a match or Bunsen burner."

Dr. Strong's blowpipe combines the principles of the familiar oxy-hydrogen or oxyacetylene blowpipes with that of thermite, a powder used for the generation of intense heat on a limited area, such as the ends of rails in welding. Thermite consists of aluminum powder mixed with another chemical which on heating yields free oxygen at a rapid rate. In the new blowpipe the oxygen is supplied directly in the form of a gas instead of being generated on the spot from a chemical.

Science News-Letter, September 14, 1929

Improves Fertilizer

Chemistry

Breaking up a low-grade fertilizer and pushing its essential elements more compactly into another combination, as one might unpack three loosely-filled trunks and cram their contents into a single tightly-filled one, is a feat that is occupying much attention on the part of industrial chemists nowadays. E. L. Larison and R. J. Caro of the Anaconda Copper Mining Company told how their concern is carrying on this process, in the interest of saving bulk and economizing on freight and truckage charges.

Among the most widely used classes of fertilizers are the phosphates. A peculiarity of phosphates is that they can exist in three forms —three degrees of chemical packing. The basic metal—calcium, usually—can carry either one, two or three units of phosphoric acid. Since the phosphoric acid is what the farmer especially wants on his field, the triple phosphate is the most desirable form, from the point of view of economy in handling. In nature, however, phosphate rock usually occurs in the single, or monophosphate form. The trick of the manufacture is to break off the phosphate portion of part of this rock, and tack two units of it on to a calcium atom already carrying one unit, thus converting the monophosphate into the more concentrated triphosphate.

Science News-Letter, September 14, 1929

Acids from Sawdust

Chemistry

Indications of a possible future use for the sawdust that now makes useless and troublesome mountains around sawmills were contained in a paper by Prof. W. H. Peterson, R. J. Allgeier and Prof. E. B. Fred of the University of Wisconsin. In a cooperative chemical-bacteriological research program, they have discovered how to make the powdery wood waste into acetic acid, the active principle of vinegar, and lactic acid, which is what makes sour milk sour. Both these acids have industrial uses that render their domestic significance an entirely secondary matter.

Three steps were involved in turning wood into acid. The first was turning it into sugar, which was done by the old familiar method of treating it with a strong chemical, such as sulphuric or hydrochloric acid. Then the pulp was further treated with a carbohydrate-converting enzyme, contained in malt sprouts. Finally, the process was completed by the addition of a microorganism that has the power to ferment both hexose and pentose sugars into acid.

From 80 to 90 per cent of the sugar present was fermented, the resulting mixture of acids consisting of ten parts of lactic to one of acetic. Wood sugar produced by the Bergius process in Germany fermented equally well and gave the same yield and ratio of products.

Science News-Letter, September 14, 1929

Ripening Gas Harmless

Chemistry

Ethylene, the gas now used extensively to bring stored fruits to a ripe color, to blanch celery, and for other purposes, appears to be harmless to animal life if there is not much of it in the atmosphere. Furthermore, it has no effect on most of the processes of digestion, and may even facilitate the digestion of starch.

These conclusions appear justified on the basis of a report made before the American Chemical Society by Dr. Arthur D. Hirschfelder and Elmer T. Ceder of the University of Minnesota. The two chemists stated that young rats given water saturated with ethylene did not have their growth checked by it, nor did other rats suffer slowing down of growth when they lived in an atmosphere containing a low concentration of the gas. An atmosphere containing one per cent of ethylene, however, did inhibit growth.

Pepsin, trypsin and lipase, digestive juices that act on proteins and fats, were neither helped nor harmed by being saturated with ethylene, but amylase, the principal digester of starch, had its action augmented by similar treatment. Ethylene alone did not convert starch into sugar, the chemists stated.

Science News-Letter, September 14, 1929

An airplane equipped with non-shatterable glass recently crashed 200 feet, and no glass was broken.

Twenty-three United States government bureaus are sending exhibits to the Ibero-American Exposition at Seville, Spain, this year.
