chemistry

AIR POLLUTION

Dual fuel system

A new fuel system to avoid air pollution is offered to owners of trucks, buses and taxis by Natural Gas Vehicles, Inc., Washington, D.C.

The dual fuel system runs on either gasoline or natural gas and is said to be easily installed without engine modification. The vehicles would burn gasoline on the highway, but natural gas within the city.

Since natural gas burns much more completely than gasoline, city pollutants from commercial vehicles could be reduced more than 90 percent.

The system consists of three parts: tanks of natural gas, a regulator system to reduce tank pressure so the gas can feed into the gas/air mixer, a combination air filter and gas carburetor. Drawbacks are tank storage and slight power loss at high speeds.

WATER POLLUTION

Sewage treatment

A new sewage purification process has been developed at New York University by Dr. Matthew M. Zuckerman, now director of development of EcoloTech Research, Inc., and Dr. Alan H. Molof, associate professor at NYU.

The process is a chemical-physical one rather than the usual biological approach. Calcium hydroxide, under varying conditions of time, temperature, pressure and acidity—depending on the degree of pollution—breaks down large, soluble organic molecules, which are then removed by activated carbon filters. The advantage of the process over conventional biological treatment is that it gets rid of large molecules.

In the laboratory, the process has purified raw sewage samples to "equivalent or better quality than the average drinking water of most cities," say the researchers.

ELECTROPHOTOGRAPHY

Organic photocopying material

A new light-sensitive material has been developed by the Japanese for film and paper used in photocopying.

Made by Matsushita Electrical Industrial Company, Ltd., Osaka, the material, which is primarily a polymeric acarbezole derivative, is the first organic semiconductor sensitive enough for practical application in the photocopying field.

The material has good image resolution and almost eliminates the time required for development and fixing processes in microfilm using the conventional silver halides, the company says. Such a photoconductor should be superior in many ways to present inorganic photoconductor materials, such as selenium and zinc oxide.

COAL

Natural gas from lignite

The construction of a pilot plant to test a coal gasification process has received a boost from the Department of the Interior.

The department has decided to provide an additional $8 million for the construction and operation of a plant which will convert lignite—a low grade coal—to gas.

Construction of the plant, which has been in the laboratory, bench scale and design stage since 1964, will begin immediately. Completion is scheduled within 19 months at Rapid City, S.D.

Key to the conversion process, called the carbon dioxide acceptor process, is the removal of carbon dioxide by the mineral dolomite during gasification of the coal. The carbon dioxide would otherwise become a noncombustible impurity in the gas. Heat is a by-product of the reaction, eliminating the costly use of oxygen.

A pilot plant to convert coal to oil is already in operation in Cresap, W.Va. (SN: 12/14, p. 593).

PLANETARY ATMOSPHERES

Venus cloud composition

University of Arizona researchers have determined the composition of the cloud layer that shrouds the planet Venus. By matching the spectral curves of various minerals, Dr. Gerard P. Kuiper finds that the planet's clouds are composed of halogen compounds (fluorine, chlorine, bromine and iodine). The halogen compounds are found on earth but in different combinations.

The small amount of water vapor detected on Venus provided the clinching proof of the cloud composition, Dr. Kuiper says. Spectrometric analysis turned up a water-containing compound, ferrous chloride dihydrate, that would be expected from the known amounts of water vapor in the atmosphere of Venus. More water vapor would have produced a tetrahydrate and less would produce an anhydrate.

INSECTICIDES

Defanging DDT

Chemists at Aerojet-General Corp., El Monte, Calif., are trying to rescue embattled DDT, already banned in several states in the U.S., and threatened with Federal action (SN: 5/3, p. 423). By 1970, they hope to have a catalyst that will decompose DDT, which presently persists for 10 to 12 years after application. The catalyst idea arose from an earlier discovery that some forms of iron weaken DDT.

Three approaches are being considered, reports Dr. Keith H. Sweeny, program manager: treating the ground with the catalyst, mixing a delayed-action catalyst in with the DDT and keeping the catalyst and DDT apart by encapsulation or with partitions which would disintegrate two to four weeks after application.

NARCOTICS

Additive defuses glue

The Testor Corp. of Rockford, Ill., has found a way to prevent young people from sniffing glue. The company, which makes plastic model cement, has incorporated into its product a chemical which irritates the eyes, nose and sinuses.

Technically known as allyl isothiocyanate, it is more commonly called oil of mustard.