chemistry

PLASTICS

Saving stamps

British chemists are testing plastics as protection for fading stamps.

Stamps which are colored by dyes fade after awhile chiefly because of the effects of ultraviolet radiation. Chemists at the British Post Office Laboratory in London hope that films made of polyethylene terephthalate and polypropylene will absorb enough ultraviolet light to offer long-term protection, something the Post Office fears the presently used films cannot. The Post Office is worried about its valuable collection at the National Postal Museum in London.

Polyethylene terephthalate is normally used for binding tape in electrical insulation while polypropylene is noted as a packaging material.

GASEOUS DIFFUSION

Japanese join the uranium club

The Japanese have entered the select circle of nations that can enrich uranium. The step paves the way for Japanese nuclear self-sufficiency. They use the customary gaseous diffusion process.

Uranium is combined with fluorine in a gas, uranium hexafluoride, which is then directed toward a filter containing minute openings which pass only uranium atoms suitable for nuclear fuel.

The filter has a theoretical efficiency of 70 percent, says the Institute of Physical and Chemical Research in Tokyo, or enough to serve Japan's needs, which do not include weapons.

Developing an efficient barrier is one step in building an enrichment installation. A commercially feasible plant requires vast amounts of electric power and capital.

SULFUR

New route to phosphoric acid

One result of the recent sulfur shortage in the U.S., which is now easing, is a new process for making phosphoric acid without using up the sulfur. Ordinarily, sulfuric acid is used to digest phosphate rock. Phosphoric acid is used in the manufacture of fertilizer and detergents as well as in animal feed, metal cleaning and foods and beverages.

In the new process developed by B. D. Bohna & Company, Inc., San Francisco, ammonium sulfate reacts with phosphate rock to produce a pure phosphoric acid. The sulfate is captured and recycled with ammonia, carbon dioxide and water to once again produce ammonium sulfate.

CHEMOTHERAPY

Anticancer agent identified

The latest natural antitumor agent to be identified by U.S. Department of Agriculture scientists at the Agricultural Research Center, Beltsville, Md., is a substance called liriodenine.

Obtained from *Annona glabra,* a tree found in Florida, the compound has shown enough inhibition of human cancer cells in the test tube to warrant further testing on animals.

In order to identify liriodenine, chemists Dr. J. David Warthen Jr., Martin Jacobson and physicist Ernest L. Gooden took 18 pounds of wood and stem bark and squeezed out an extract which they broke down into six fractions, or mixtures of compounds. Using analytical techniques such as mass spectrometry and nuclear magnetic resonance, they identified the compound.

AIR POLLUTION

Smog in a computer

A computer simulation of chemical reactions that go on in smog has been worked out by a University of Southern California scientist.

The program, devised by Dr. Lowell G. Wayne of USC's air pollution control institute, will enable various theories of the build-up of different smog components to be tested.

The program is essentially a record of the increases and decreases of individual smog components, such as nitrogen dioxide, nitrogen oxide, ozone and propylene. Ultimately, the computer will relate these individual variations to each other to obtain its total picture of what occurs in smog. Any theory attempting to explain why individual smog components vary could then be corroborated by the computer.

PROPELLANTS

Smoking, flashing less, enjoying more

A new gunpowder is said to alleviate the problem of overheated guns. Called NACO, for Navy Cool, it was developed at the Naval Ordinance Station, Indian Head, Md. Because it burns at a temperature 300 degrees F. lower than regular gunpowder, it can double the life of rapid-fire guns and reduce barrel wear by 50 percent. The low burning rate is achieved by decreasing the amount of nitrocellulose normally used in gunpowder and adding an oily substance, butyl stearate, as a coolant.

Another characteristic of NACO is that it is nearly smokeless and flashless, thus not giving away a ship's position by day or night. Presently, the Navy uses different types of gunpowder for night and day firing because of the flash problem.

MATERIALS

Abrasive second only to diamond

A new grinding material, second only to diamond in hardness, has been developed by researchers at General Electric. It is made by subjecting boron nitride crystals, naturally hexagonal in shape, to temperatures of 3,000 degrees F. and pressures of one million pounds per square inch to produce cube-shaped crystals. The resulting structure thus resembles a diamond crystal. Called Borazon (the azo stands for nitrogen), it threatens to take the place of aluminum oxide in the precision grinding of hardened steels. It has the advantage over diamond of not burning at temperatures above 1,600 degrees F.