

chemistry

POLYMERS

Plastics tested

A team of scientists at the National Bureau of Standards has just completed a two-year test-method study on the effects of weathering on 20 different plastics. Ultimately, the methods would provide a way to predict a plastic's weatherability.

In the study, the appearance and physical properties of the plastics were observed in outdoor tests in Arizona, Florida and Washington, D.C. Because of heat and ultraviolet and visible light, the plastics in Arizona deteriorated fastest; those in Washington held up best.

The study has demonstrated that clear polyvinyl chloride plastics show the greatest discoloration and the largest loss in flexibility and elasticity. The greatest change in the plastics occurred in the second year.

PETROLEUM

Oil recovery method

The U.S. Bureau of Mines is conducting an experiment to get oil from oil shale without taking the shale out of the ground.

In the technique, called in-situ retorting, a central well and recovery wells are drilled. Water under pressure is pumped down the wells, creating fractures in the shale. A liquid explosive is detonated, enlarging the fractures further.

Propane gas is then fed in and ignited in the central well. Combustion is kept going by pumped air. The heat moves out from the central well through the fractures and carries with it an oil mist that is collected in the recovery wells.

Oil has been recovered by the new method. By showing that combustion can be sustained in the oil shale deposit, the experiment paves the way for nuclear assisted recovery of oil.

PESTICIDES

Specific mite-killer

A new pesticide to kill mites—tiny creatures akin to spiders—has been announced by Uniroyal, Inc. The compound, a sulfite, is selective against crop-eating mites but leaves unharmed beneficial insects, such as bees, and permits good survival of predator mites that feed on the plant eaters.

Mites have been developing resistance to the usual organophosphate and chlorinated pesticides, many of which cannot be stored for long periods of time. The new pesticide overcomes these drawbacks; it retains its killing power for several years.

METALLURGY

Insight into stress corrosion

Stress corrosion is an insidious process in which a chemical corrodent combines with mechanical stress to propagate a minute crack through a metal structure rapidly, causing it to fail. Although there are theories, no one knows definitely what the actual stress corrosion

mechanism is. But now a new analytical method developed by The Naval Research Laboratory in Washington is providing clues to what goes on inside the crack.

The method freezes the corrodent solution with liquid nitrogen, thereby stopping the chemical reaction. The crack is split open and the corrodent melts and is then analyzed. First results show definite proof that a change occurs in the chemical composition of a corrodent, such as seawater. The change was indicated by measurements showing a considerable increase in acidity at the tip of the advancing crack.

PLASTICS

Irradiation increases strength

Japanese chemists have developed a way to make polyvinyl chloride plastics more shock resistant. Using gamma rays from a cobalt 60 source, researchers at the Radiation Chemistry Research Establishment near Tokyo have polymerized PVC with gaseous butadiene, a synthetic rubber material. The end product is 50 times as strong and more impact resistant than regular PVC.

In the U.S., butadiene is incorporated into PVC in the form of acrylonitrile-butadiene-styrene plastic by a blending process. The Japanese process would be more efficient and less expensive.

WATER POLLUTION

Testing method inadequate

Chemists at Rutgers University have found the present test method for the detection of phenolic compounds in industrial and municipal waste water is inadequate. Phenols are toxic organic compounds given off by many industries, especially the petroleum industry. They are also used in paints and drugs and as weed killers.

The method employs the chemical 4-aminoantipyrine which turns purple in the presence of phenols. However, the chemists, led by Prof. Samuel D. Faust, found in a 29-month test that the recommended acidity of the 4-aminoantipyrine solution was too low, and the testing solution was not picking up complex phenol compounds.

Using a more acidic solution, the scientists found other phenol compounds that had gone undetected by the lower acidic method at levels exceeding that recommended by the New Jersey Health Department as safe for drinking.

AGRICULTURE

Coal for plant growth

In an effort to increase crop yields, chemists at the U.S. Bureau of Mines are using coal as a substitute for humus, the organic portion of soil. The coal in this case is Leonardite, or slack lignite, a brown, incompletely formed coal, unusable for fuel.

A 28 percent increase in potatoes and more vigorous soybean growth have been observed where coal was applied. Philip G. Freeman of the bureau's Grand Forks, N.D., coal research laboratory attributes the coal's effect on crop growth to its similarity to regular humus, enabling it to function as an exchange medium for the transport of iron to the plants.