

# U.S.I. CHEMICAL NEWS

August

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A Series for Chemists and Executives of the Solvents and Chemical Consuming Industries

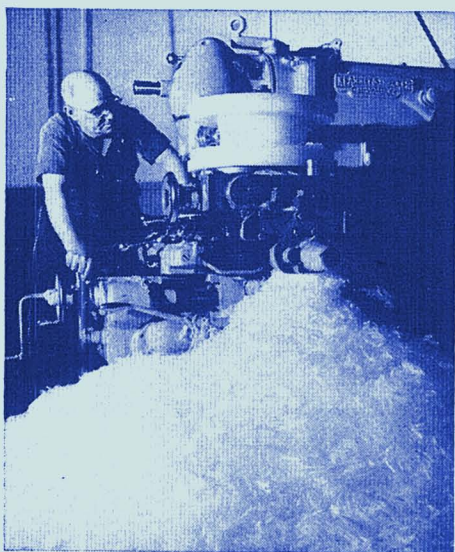
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## Polyethylene Used for Insulators in Nuclear Weapons Research Work

Two large polyethylene insulators, 18½ inches in diameter, have been made for use with a unique electrical switch in the discharge of heavy current loads from large condenser banks. Insulators and switch are reported to be part of research equipment used by nuclear physicists in the simulation and study of various aspects of nuclear weapons systems.

Polyethylene was chosen for its good insulating qualities, it is reported. Each insulator is said to be capable of withstanding voltages in the neighborhood of 100 kilovolts. The insulators were carefully milled to insure design compatibility with the special two-million-ampere switch.



Milling polyethylene insulator for use with unique electrical switch in nuclear weapons research. (Photo courtesy Boeing Airplane Co.)

## New Chlorine Booklet Is Offered by U.S.I.

Facts about chlorine are detailed in a concise new booklet just released by U.S.I. Illustrated with photographs, drawings, graphs and charts, the 28-page booklet describes chlorine's chemical and physical properties in detail, and gives information on shipping, handling, safety measures and applications.

The company is preparing a similar publication on caustic soda which will be available shortly. For your copy of the chlorine booklet, write to the Technical Literature Dept., U.S.I. Chemical News, 99 Park Avenue, New York 16, N. Y.

## Sodium Process Developed by U.S.I. Proves Economical for Desulfurizing Coke Oven BTX

Thiophene Levels in Benzene-Toluene-Xylene from Coke Oven Sources Reduced to Less Than 1 PPM. Purities Match Those Of Petroleum Products, with Treating Costs of Only 1-2¢/Gal.

Recent demands for low-thiophene benzene and toluene are creating new interest in desulfurization processes. To remain competitive with low-thiophene petroleum fractions, coke oven producers today must further treat their light oils to reduce thiophene content. Usual specifications are less than 1 ppm. Workable treating processes developed so far have proved economical only for very large scale coke oven operators who can invest in extensive equipment. The smaller operator has remained handicapped, and has been seeking methods involving lower capital outlay.

### National Distillers—Food Machinery Joint Venture Gets Rocket Fuel Contract

Contracts for multi-million pound quantities of unsymmetrical dimethylhydrazine have been awarded by the Air Force Air Material Command to a joint venture of the Food Machinery and Chemical Corp. and the U.S.I. division of National Distillers. These contracts total more than \$20,000,000. The material, called DIMAZINE\* by the joint venture, is a storable, high-energy liquid rocket fuel.

FMC and U.S.I. pioneered in the commercial development of unsymmetrical dimethylhydrazine, and have been its principal producers for several years. The Air Force's DIMAZINE requirements will be produced in expanded facilities at Baltimore, Md.

DIMAZINE is a completely synthetic fuel. It is used with liquid oxidants in bi-propellant engines of the type that power most of this country's large rocket vehicles as well as various smaller ones. Unsymmetrical dimethylhydrazine is unique in being the only synthetic fuel used in a substantial number and variety of the nation's operational rocket programs for scientific and military purposes.

\*Registered Trademark of Food Machinery and Chemical Corp.

Recently, U.S.I. has been working with coke oven producers on the application of sodium desulfurization to this problem, with some very practical results. It has been found that, for only a little over a cent per gallon in treating costs, light oil feeds from coke oven sources can be purified to the desired levels. Further, this processing method is economical even for the small-scale producer.

### Two U.S.I. Processes Available

Two general processes have been worked out by U.S.I. for the sodium desulfurization of light oil feeds in the vapor phase. In one, a mechanically agitated high-surface-sodium bed is used. In the other, vapor fluidized high-surface-sodium is employed.

Many samples of light oil from various parts of the country have been investigated in pilot units of these two types at U.S.I.'s research laboratories. The results of three such investigations, with calculated direct operating costs, are given in the

**MORE**

PILOT PLANT DATA—SODIUM DESULFURIZATION TEST RUNS

Acid-Washed BTX Sample	Process	Temp.	Na Level #/gal. feed	Contact time, sec.	Orig. thiophene content ppm	Final thiophene content ppm	Cost of treatment ¢/gal.*
A	Mechanically Agitated Reactor	450–500°F	.025#/gal.	10 sec.	45 ppm	less than 1 ppm	1.4¢/gal.
B	Fluidized Bed Reactor	450–500°F	.013#/gal.	10 sec.	1,000 ppm	less than 1 ppm	1.1¢/gal.
C	Agitated Reactor	450–500°F	.01#/gal.	10 sec.	170 ppm	less than 1 ppm	1.7¢/gal.

\* These are total calculated operating costs—including raw materials, utilities, labor and maintenance—for 3 different locations and different capacities. Cost figures are therefore not comparable.



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### Sodium Desulfurization

accompanying table. These figures are for BTX mixtures. The same processes can be used to treat benzene-toluene, benzene alone, or toluene alone—at still lower operating costs.

#### Distillation Removes Many Impurities

While the whole crude light oil may be desulfurized with sodium, distillation prior to sodium treatment is a more economical method for removing many of the sulfur compounds and other impurities present. Thiophene, of course, cannot be removed economically by distillation. An acid wash prior to sodium treatment is also used frequently to lower the level of some impurities.

Since purity requirements are usually less critical for xylene than for benzene and toluene, it is generally considered preferable to separate xylene from BTX mixtures before sodium refining. This min-

imizes sodium consumption. If necessary, xylene can be purified by itself.

For further information, send for the new U.S.I. technical data bulletin "Desulfurization of Benzene, Toluene and Xylene by Sodium." Address Technical Literature Department, U.S.I. Chemical News, 99 Park Avenue, New York 16, New York.

For commercial-scale processes developed by U.S.I., and for their costs, U.S.I. can put interested parties in touch with engineering companies who have developed plant designs for these processes.

#### Process Good for Many Hydrocarbons

Sodium desulfurization has also been used successfully with other hydrocarbons such as naphthalene. U.S.I. researchers have broad experience with this process, and will be glad to work with interested companies.

### New Extinguisher Quenches Three Types of Fires

For the first time in history, a fire extinguisher has been developed which will put out all types of fires, according to recent reports. The extinguisher is said to do an effective job of quenching the three principal kinds of fires—those in combustibles like paper and wood, those involving flammable liquids like gasoline, and those in electrical equipment.

It uses a non-caking and moisture-repellent dry chemical which expands into a rubbery mass when exposed to heat. This action tends to smother the fire.

Up to this time the many kinds of fire extinguishers have been able to handle one, and sometimes two, classes of fires, but never all three. While the new extinguisher is claimed effective on all three, it does not supplant other extinguishers which may have superior quenching powers on a particular type of fire.

### Rapid Chemical Reactions Analyzed by Photoflash

By exposing various materials to billion-watt flashes of light that last only a millionth of a second, chemists have recently observed many of the short-lived substances that play key roles in photochemistry, it is reported. Called "flash photolysis," the new analytical technique has already revealed the details of important chemical processes in areas ranging from inorganic chemistry to biology.

The technique employs a microsecond flash of strong light to start the reaction. Then, after an interval of a hundred thousandth of a second or less, the mixture is analyzed spectroscopically by a fainter burst of light. In this way, intermediate products with a lifetime of only a few millionths of a second have been positively identified, according to the report.

## TECHNICAL DEVELOPMENTS

Information about manufacturers of these items may be obtained by writing U.S.I.

**Patented process for making organic microfibers** now being licensed. In process, vinyls, acrylics, nylon, polyesters, asphalt, etc., are melted or dissolved and sprayed to form superfine fibers. Suggested for filters, other uses. **No. 1620**

**Variable programming systems, for automation** of chemical analyses and procedures in clinical and biochemistry, now on market. Units include indexing, transfer, storage, centrifuging, incubating, programming mechanisms. **No. 1621**

**Corporate diagrams and administrative personnel of the chemical industry** are presented in new, looseleaf edition of reference book now being sold. Supplement also supplied to keep information up-to-date. **No. 1622**

**Counter-current, liquid-liquid extractors** for complex solvent extraction are described in new bulletin now available. Extractors incorporate several mixing and separating stages in single bowl revolving at high speed. **No. 1623**

**How ammonium nitrate behaves under fire conditions** is covered in new article which can now be purchased at nominal price. Conditions necessary for explosion are detailed, as are fire-fighting procedures and storage methods. **No. 1624**

**POLYMER**, a new international quarterly devoted to science of large molecules, is now offered on paid subscription basis. Provides medium for publication of original papers on chemistry, physics, applications of polymer research. Includes publicity on papers to come. **No. 1625**

**Technique for producing flame-resistant urethane foam** of polyester type is described in new bulletin now available. Reveals that additions of tris (beta-chloroethyl) phosphate (TCEP) to foam mix controls burning rate. **No. 1626**

**New, low-cost infrared spectrophotometer** makes possible high-resolution runs in near-infrared wavelength region between .83μ and 7.65μ. Gives exact structural information on organics with C-O and O-H molecular configurations. **No. 1627**

**Alkaline electrocleaner**, containing chelating agents, has been introduced for heavy-duty anodic cleaning of heavily soiled steel which has enough smut, rust or oxides to defy complete cleaning in conventional electrocleaners. **No. 1628**

**Tantalum and niobium metallurgy** are subject of recent book which can now be purchased. Covers extraction, reduction, consolidation, working. Includes chapters on physical, chemical, mechanical properties; corrosion; alloys. **No. 1629**

## PRODUCTS OF U.S.I.

### HEAVY CHEMICALS

**Sodium, Metallic:** cast solid in tank cars, steel drums, pails; bricks in barrels, pails.  
**Caustic Soda, Chlorine**  
**Phosphoric Acid, Fertilizer Grade**  
**Ammonia, Anhydrous:** commercial & refrigeration. Tank cars or tank trucks.  
**Ammonium Nitrate, Nitric Acid, Nitrogen Fertilizer Solutions**  
**Sulfuric Acid:** all strengths, 60° Baume to 40% Oleum. Also Electrolytic grade to Federal specifications. Tank cars or tank trucks.  
**Sodium Peroxide**

### OTHER PRODUCTS

**PETROTHENE®** Polyethylene Resins  
**MICROTHENE®** Finely Divided Polyethylene Resin.

**Pharmaceutical Products:** DL-Methionine, N-Acetyl-DL-Methionine, Urethan USP, Intermediates.

**Ethyl Alcohol:** Pure and all denatured formulas; Anhydrous and Regular Proprietary Denatured Alcohol Solvents SOLOX®, FILMEX®, ANSOL® M, ANSOL® PR.

**Organic Solvents and Intermediates:** Normal Butyl Alcohol, Amyl Alcohol, Fusel Oil, Ethyl Acetate, Normal Butyl Acetate, Diethyl Carbonate, DIATOL®, Diethyl Oxalate, Ethyl Ether, Acetone, Acetoacetanilide, Acetoacet-Ortho-Chloranilide, Acetoacet-Ortho-Toluidide, Ethyl Acetoacetate, Ethyl Benzoylacetate, Ethyl Chloroformate, Ethylene, Ethyl Sodium Oxalacetate, Sodium Ethylate, Urethan U.S.P. (Ethyl Carbamate), Riboflavin U.S.P.

**Animal Feed Products:** DL-Methionine, MOREA® Premix (to authorized mixer-distributors).

**U.S.I. INDUSTRIAL CHEMICALS CO.**  
Division of National Distillers and Chemical Corporation  
99 Park Avenue, New York 16, N. Y.

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