

## CERAMICS

### Rapid silica estimation

The richness of ores containing titanium and zirconium is reduced by the amount of silica they contain. To determine the amount of this impurity, scientists at the Central Glass and Ceramic Research Institute in Calcutta have developed a volumetric method for the rapid (30 minutes) and accurate estimate of silica.

The material is melted with sodium peroxide in a nickel crucible and then dissolved with hydrochloric and nitric acids. Citric acid is added and the silica is precipitated out as potassium silicofluoride. Water is added to form hydrofluoric acid, which is measured against a standard sodium hydroxide solution to obtain the concentration of hydrogen and hence fluoride ions. The fluoride ion concentration in turn reflects the amount of silica, since there is six times as much fluorine in potassium silicofluoride as there is silicon.

## AUTOMOBILES

### Additives to control carbon monoxide

Carbon monoxide emission from internal combustion engines, a major source of air pollution, has been extensively investigated, but most of the research has been concentrated on afterburners and catalytic oxidizers in the exhaust system.

The problem with these devices is their cost and the fact that they wear out relatively soon.

A different approach is described by the British Petroleum Co., Ltd., which suggests additives for gasoline to improve combustion.

The output of carbon monoxide from a gasoline engine is normally at a maximum at idling speed and amounts to about 7.5 percent by volume of the exhaust. This can be reduced to nearly half that figure by adding a small quantity of a polyolefin or poly-alkylmethacrylate. In particular 0.33 percent poly-4-methylpentene-1 has shown good results.

Although no explanation is suggested for the phenomenon it seems that the increase in viscosity of the fuel produced by the additive is an important factor. What may be even more significant, from a practical viewpoint, than the reduction of carbon monoxide in the exhaust is that during experiments fuel consumption was reduced by about 10 percent when the additive was used.

## PETROLEUM

### Undersea oil storage

Japan has an oil storage problem: too much oil and not enough land. But Japan has plenty of ocean, and so engineers are experimenting with the idea of storing the oil in undersea tanks of steel and rubber. The Technical Research Society for Undersea Oil Storage, Tokyo, has already completed a prototype tank one-tenth the projected practical size. It is 10 feet high, 17.5 feet in diameter and has a capacity of 40 kiloliters. The bottom is steel and the top half is rubber, which distends like a balloon when the tank is filled and collapses when it is emptied.

The tank has undergone a successful leakage test at

the crucial junction of the steel and rubber. Further tests of the effects of water pressure, sea currents and paint erosion will be held. After that, a 100,000 kilogram tank will be built 260 to 275 feet underwater.

Rubber and nylon tanks with greater capacity have been used in Vietnam (SN: 8/3/68, p. 115) but the steel bottomed tanks are more suitable for under-ocean use.

## SHIPBUILDING

### Making polyester ships

A shipbuilder at Bremerhaven, Germany, has received his first order for a plastic ship—an idea he spent \$25,000 developing.

Gustav Kuhr, shipbuilding engineer and dock owner, believes the polyester prototype is the first of its kind. Only the masts and some fittings are of non-plastic materials.

Kuhr's first order is for a 50-foot cutter designed for crab hunting. It is slated to be launched for its first test outing before the end of the year.

With a price tag of about \$37,500, the ship will be nearly \$2,500 to \$5,000 more expensive than comparable-sized wooden cutters. But he believes maintenance costs will be practically nonexistent. Polyester doesn't rust and to clean it, a wash down with a water hose is sufficient.

Kuhr has already made a name for himself with his unsinkable life boats, now widely used in many parts of Europe.

## UNITS AND MEASUREMENT

### British military metric by 1976

In line with Britain's plan to convert to the metric system, the military has announced its conversion schedule.

Starting from Jan. 1, 1970, documents such as instruction manuals concerned with equipment for the British defense forces will utilize in metric units only. For some time past the documents have given both English and metric units. Design drawings for such equipment will also be in metric terms alone after Jan. 1.

Equipment procured for the defense services will have to be designed on metric standards after Jan. 1, 1976. From the beginning of 1970 metric equipment will be preferred to equipment designed on English units.

## TECHNOLOGY

### Floating fish food factory

A Swedish firm is planning to have a floating fish protein factory in operation by 1971, a year after Ocean Harvesters, Inc., begins production at a land-based factory (SN: 11/9, p. 476). The protein concentrate, a tasteless and nearly odorless powder, will be made aboard Scandinavia's largest whaling factory ship, the 25,000-ton Thorshavet, operated by Astrat Overseas Shipping Co.

The ship, which is expected to process 200,000 tons of fish a year, will operate in international waters and will be accompanied by a fishing fleet of 10 vessels.