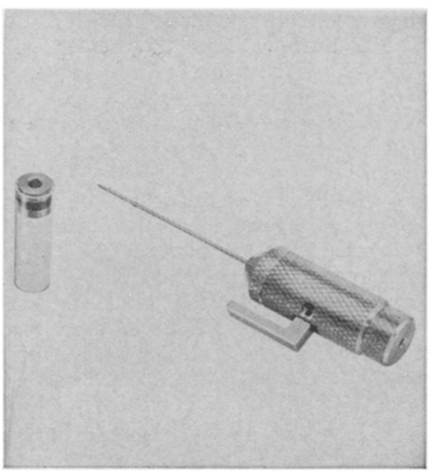
new products

Gas chromatograph injector



A problem with injecting material into a gas chromatograph, which analyzes minute samples to determine their composition, is the difficulty in getting the same volume of sample into the chromatograph each time. A new submicroliter injector has removed the problem. It offers sample reproducibility, something a conventional injection syringe cannot do since it depends on the manual ability of the operator to repeat his own injecting technique precisely.

The injector consists of a fine capillary tube and a penetrating needle with a side hole opening. In filling the injector, a vial is used which contains the liquid sample to be analyzed. At first, it overfills the capillary because pressure is exerted on a plunger of the vial, forcing the liquid through the capillary. But the overfill is forced out through the side hole opening, thus insuring that the capillary is never over or underfilled. The injector can introduce samples as small as .0001 milliliter.

When the operator inserts the needle into the gas chromatograph, he depresses a lever, which opens the side hole. The carrier gas of the chromatograph then sweeps out the sample, introducing all of it into the chromatograph each time.

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Power source

Atomic absorption instruments require light of specific wavelengths to analyze materials. The lamp that provides such monochromatic light has its own power requirements which exceed the normal line voltage of 110 volts.

A step-up power supply source to the lamp has been developed which not only provides the needed voltage but whose current output is practically unaffected by changes in line voltage. Voltage changes are fairly common occurrences in the home, but when they occur with an absorption instrument, they can affect the intensity of the light output, thereby ruining the delicate scientific measurements.

The new power source contains a built-in meter, which regulates current flow in accordance with changes in line voltage from 100 to 130 volts. Its output is AC (modulated) or DC and is applicable to a whole range of current cycles at which absorption instruments work. In fact, it can work at a frequency of anywhere from 10 to 10,000 cycles per second. Its operating current range of 1 milliamp to 100 milliamps gives it twice the range of other power sources. Although not needed now, this extra current will be valuable in the near future, when newer, higher intensity lamps with interchangeable elements come out. The instrument weighs 20 pounds and can operate at 285 volts with a start-up voltage of 400.

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Laser windows

Because a laser beam is light with a specific wavelength, it requires a special window or exit port that will permit that wavelength to pass through. Conventional optical materials are inadequate when it comes to the higher powered lasers. Gallium arsenide is one material that can withstand the high energy of the laser beam and is used as the window in the transmission of infrared radiation from carbon dioxide lasers. Until now such windows have been limited in size to about one inch in diameter.

Now gallium-arsenide disks two inches in diameter are being offered. By letting more energy through, they permit the operation of continuous-wave carbon dioxide lasers with powers of 100 kilowatts or more. They work at 10.6 microns, the most frequently used wavelength in the 2- to 14-micron band.

The disks were obtained by using a different growing technique for the gallium-arsenide crystals, resulting in large pieces of gallium arsenide with excellent optical properties. The next step is larger crystals for modulators at higher power levels.

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Bio Analyzer

The honeybee is responsible for a new instrument that identifies drug compounds—including narcotics—and pollutants. For several years, scientists have known that the honeybee abdomen is a complete physiological unit unto itself, and that what affects it also affects humans. A bioelectronic instrument called a Bio Analyzer has been developed around these two principles.

A solution containing a drug, pesticide or air or water pollutant is introduced into the severed abdomen of the bee. The resulting movements of the abdomen during digestion and metabolism are picked up by a transducer and translated into electronic pulses. Only a one- to two-second wait is necessary. The pulses are characteristic of the specific drug, pesticide or pollutant that has been introduced. From their readouts on a chart recorder, a researcher can identify a compound.

In the case of complex mixtures, such as those that occur in samples of polluted air and water, the instrument gives a mixed, or complex, readout. A processing channel, or frequency separator, can isolate the individual components of the readout. Then it is up to the researcher to recognize the readout of the particular chemical he is interested in. He would do this by comparing it with a previously determined readout for the chemical.

Because of its speedy operation, it could be used in hospital emergency rooms where time is vital in determining cases of drug or poison overdose.

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