Proceedings of the Iowa Academy of Science

Volume 44 | Annual Issue Article 21

1937

Automatic Hydrogen-Sulphide Generator

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AUTOMATIC HYDROGEN-SULPHIDE GENERATOR[1]

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Supplying hydrogen-sulphide gas for a small class in qualitative analysis is usually a difficult problem in a small laboratory. This problem was solved at Upper Iowa University by using the commercial product "Aitch-tu-ess" (H_2S) as the source of the gas and setting up the apparatus. This method was found to be both economical and convenient and eliminated practically all of the undesirable odor which so often accompanies a qualitative analysis laboratory.

The gas is generated in a pyrex tube 25 × 300 mm., covered with 1/32″ sheet asbestos and wound with 55-60 turns of Nichrome wire gauge No. 24, 1.59 ohms per foot. Alternating current of 110 volts, 60 cycles was used. The rest of the apparatus with the exception of the switch is relatively simple. The automatic switch consists of a short glass tube mounted on a pivot in such a way that an increase or decrease in pressure in the storage bottle will "make" or "break" the heater coil circuit. The mounting for the glass tube was cut from sheet copper and mounted on the baseboard with a screw, with a washer between the mounting and baseboard to hold the switch away from the baseboard. The switch mounting is connected with the glass float by means of a sheet copper arm. The float consists of a glass vial with a cork stopper. The arm is connected to the stopper by a pin. Mercury is used in the float to act as a counterbalance and makes the switch sensitive to a slight pressure change.

A short tube made by melting a test tube in half and sealing the end acts as the holder for the brass (copper may be used) contacts and the globule of mercury. It is fastened to the mounting with rubber bands. Brass contacts $\frac{1}{8}$″ wide are held in place by the stopper and form a small cap. When the pressure decreases the mercury level falls, causing the float to drop, which in turn pulls the contact end of the switch downward and the globule of mercury in the short test tube closes the circuit between the two electrodes. As soon as the pressure is built up in the storage bottle the mercury is raised, causing the float to push the switch in an

1 Originated and developed by Donald Holland, formerly Head of Physical Science Dep't. at Upper Iowa University, assisted by George Atchison.

upward direction and the mercury globule returns to the other end of the tube, thus opening the circuit.

A separatory funnel was used for the mercury well, so a slight change in pressure produces a large rise or fall of the level of the mercury in the tube supporting the float.

A bottle of about 150 liters capacity may be found in any laboratory and makes an excellent storage bottle. The pyrex tube costs 17 cents and a 25 foot spool of Nichrome wire can be purchased for 50 cents. The remainder of the apparatus may be found in any chemistry laboratory.

This generator has been in use for eighteen weeks and supplies hydrogen-sulphide gas for a class of twenty students at a cost of approximately 50 cents per student per semester. The capacity of the system depends upon the size of the generating tube and the storage bottle.

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