

50. On Some Device of the Gas Leak Apparatus for Measuring the Pumping Speed.

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The pumping speed of the diffusion pump for various gases were measured by evacuating the gas reservoir through the porcelain of constant conductance. The leaking quantity and the vacuum pressure were easily obtained and consequently the pumping speed was given.

When the gas leaks through the porcelain of conductance G from the vessel of volume V and of the initial pressure p_0 , its pressure p after time t is shown as

$$p = p_0 \exp(-Gt/V),$$

and the leaking quantity q also decreases exponentially as

$$q = G \exp(-Gt/V).$$

Denoting the vacuum pressure of the diffusion pump side as p , the pumping speed Q is given by the following relation.

$$Q \cdot P = G \cdot p = q \cdot p.$$

By using the leak apparatus which satisfies the above mentioned conditions the speed at different pressures could be measured by several hours' run of the experiment.

For example, a diffusion pump had the speed of about 19 liters per sec. in the range of $1.2 \times 10^{-3} \sim 5.0 \times 10^{-4}$ mm Hg, but this began to fall at the neighbour of 4×10^{-4} mm Hg.

In addition, the relation between the speed and the different heater input was obtained under the constant pressure in the gas vessel, which showed a comparatively narrow range for its high pumping speed.

51. Study on Clay. (III)

Dielectric Properties of Mud Pastes under Alternating Field of Low Frequency.

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The capacity between the nickel parallel plate electrodes inserted in mud was measured by the bridge method.