Theoretical Consideration for the Mechanism of the Probe Gas for High Vacuum Leak-Detection

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In order to analyze the mechanism of the leak-detection with the probe gas, the substitution sensitivity factor ϕ (J.Blears, J.H.Leck, *Journ. of Sci. Instr.* Sup. No. 1, 22, (1952)) for the ionization guage (apparent change of air pressure in the vacuum caused by covering leak with probe gas) (mean air pressure before probing) was caluculated. It was assumed that, Poiseuille's law is applicable for the gas flow through the leak (J.Blears : *ibid* ; S.Dushman : "Scientific Foundation of Vacuum Technique", p. 84, (John Wiley & Sons, New York, 1949); A.Gutherie, R.K.Wakering : "Vacuum Equipment & Technigues," p. 22, (McGraw-Hill Book Co., New York, 1949)) and the ionization cross-section of the gas molecule is built up as the sum of the contributions from the component atoms (H.S.W.Massey and E.H.S.Burhop : "Electronic Ionic Impact Phenomena," p.191, (Oxford, at the Clarendon Press, 1952)).

The values of ϕ calculted for H_2, CO_2, C_4H_{10} and coal gas were in agreement with the observed values approximately, The theory was, however, in valid for the "vapour" with low vapor pressure at room temperature such as C_6H_6, CCl_4 etc. The reason of these disagreements is mainly ascribable to the "imperfection" of vapors ; this effect reduces the ϕ-value in a way for which Poiseuille's law is of no quantitative use. So, the more rigorous treament for vapours would be desirable.

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On the Constitution of Zinc-Ferrite. (II)

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In the previous report, the constitution of Fe_2O_3-$ZnFe_2O_4$ system was reported. In this paper explanation is given on the constitution of the $ZnFe_2O_4$-ZnO system and the formation of magnetite in the Fe_2O_3-ZnO system.

Fe_2O_3 and ZnO are mixed in various molar ratio (ZnO : Fe_2O_3), and the mixtures are pressed in the mould under 80 kg./cm². pressure and heated at 1000°, 1100° and 1250°C for 3 hours.

For each sintered sample, Debye-Scherrer X-ray photograph was taken, and the magnetic properties were measured by the ballistic galvenometer method. After these experiments