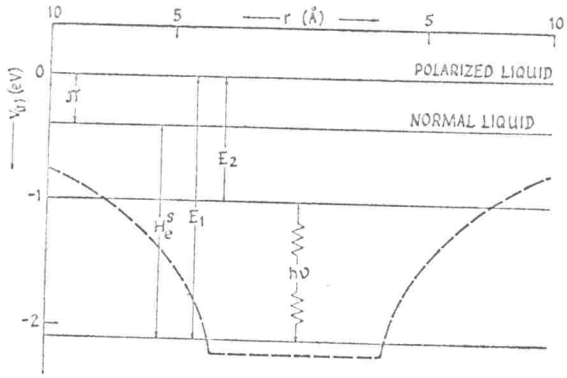

FIG. 1. $1s \rightarrow 2p$ transition of an electron in liquid ammonia.

placed at infinity from the cavity center.

$$V(r) = -\frac{s\mu e}{r_0^2} - \frac{s\alpha e^2}{2r_0^4} - \frac{2\pi N\alpha e^2}{r_0 + 2r_{NH_3}} \qquad r < r_0 \quad (1a)$$

$$V(r) = -\frac{e^2}{r}\left(\frac{1}{D_{0p}} - \frac{1}{D_s}\right) \qquad r > r_0 \quad (1b)$$

where r_0 is the e.c. radius, r_{NH_3} radius of solvent molecules, s number of solvent molecules surrounding the e.c., α polarizability of solvent molecule, μ dipole moment of solvent molecule, N number of solvent molecules per cc in the bulk, and D_{0p} and D_s optical and static dielectric constants.

Equation (1a) is based on a rough structural model. The third term was obtained from the expression

$$\int_{r_0+2r_{NH_3}}^{\infty} \frac{\alpha e^2}{2r^4} 4\pi N r^2 dr.$$

Equation (1b) is Landau's expression for a potential well formed by directed dipoles surrounding a negative charge. The approximate value of $r_0 = 3.6$ A is calculated assuming continuity of $V(r)$, setting $s = 4$.

The dipole rearrangement energy-Π-required for formation of the potential well was calculated from an electrostatic model. The value $\Pi = 0.45$ ev was obtained.

In the potential well (1) an infinite number of stationary states ($W_1 W_2 \cdots$) exists. For the higher states:

$$W_n = \frac{me^4}{2\hbar^2 n^2}\left(\frac{1}{D_{0p}} - \frac{1}{D_s}\right)^2 \qquad n = 2, 3 \cdots. \quad (2)$$

For the ground (1s) state W_1 is obtained from

$$H_e^s = W_1 - \Pi \quad (3)$$

hence $W_1 = 2.1$ ev $W_2 = 1$ ev.

During the electronic transition the dipole arrangement is not changed. Hence we get

$$h\nu_{1\rightarrow n} = W_1 - W_n = H_e^s + \Pi - W_n. \quad (4)$$

We assume that these numerical results are applicable to all systems of Table I. For the $1s \rightarrow 2p$ transition $h\nu = 1.1$ ev (see Fig. 1). The intense bands a, b, d, f, h, i refer to this transition. For transitions to higher states the series limit is 2.1 ev. The bands c, e, g, j are attributed to these transitions. The experimental results for ammonia are in agreement with these calculations.

Spectrophotometric evidence for the existence of e_2 centers[1] may be found in the k band. This assumption is supported by the observation[7] that irradiation at the i band wavelengths gives rise to a reversible change in the k band intensity, indicating that at low temperatures an e.c. may possibly act as an electron trap.

Our results make possible the calculation of v for liquid ammonia.

Setting[8] $a = 1.6$ ev from

$$a = H_e^s + \Pi + ev \quad (5)$$

we get $v = -0.5$ volt.

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Plasma Augmentation of the Surface Conductivity of Glasses

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THE purpose of this note is to call attention to an effect which we have observed when highly ionized gases are in contact with normally nonconducting surfaces, especially glasses. Superficial conductivity is then observed over the nonconductor, and its magnitude seems to be a function of the ion (presumably electron) concentration in the plasma. At a plasma concentration of 10^{16} to 10^{17} ions/cc, superficial conductances of the order of 1 mho or less have been estimated. The technique of the experiments was as follows: a flowing hydrogen plasma was passed down a tube through a transverse magnetic field, and probes were introduced into the plasma through holes in the glass walls. Normally the plasma resistances observed are of the order of 1000 ohms, but when the probes are allowed to touch the glass walls on both sides, the indicated resistance between the probes (while normally