ELECTRONIC PARAMAGNETIC RESONANCE SPECTRA OF FROZEN OH *RADICALS*

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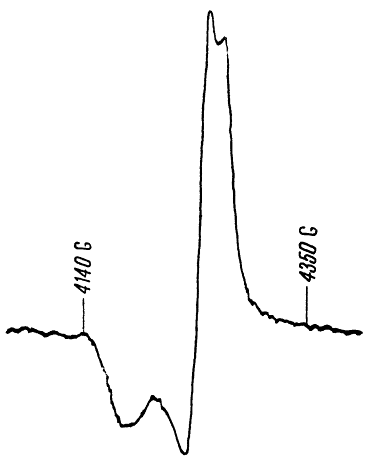
THE observation of an electronic paramagnetic resonance spectrum of radicals obtained by freezing the electric discharge products in H_2O or H_2O_2 vapor, was reported previously.[1,2] Subsequent investigation of these radicals* did not permit identification of the radicals obtained from the discharge.

To determine these radicals, we decided to investigate in detail the spectrum of the radicals obtained by ultraviolet irradiation of frozen H_2O_2 and to compare these spectra. We assume that the radicals obtained by ultraviolet† irradiation of frozen H_2O_2 ($T = 77°K$) are OH radicals, since the spectrum of the mercury arc lamp employed by us (SVDSh-1000) contains no quanta capable of breaking the O—H bond (110 Kcal/mole). Since the spectrum of the radicals does not depend on the peroxide concentration in 5 to 98% aqueous solutions, it is assumed that there are no secondary reaction.

We observed the electronic paramagnetic resonance spectra at 12,000, 9400, 2600, 1300, and 850 Mcs. At all these frequencies, the spectrum of the OH radicals coincided with the spectrum of the radicals obtained from the discharge. Consequently, the radical obtained by freezing the discharge products in H_2O and H_2O_2 vapor is essentially the OH radical.



At 850 Mcs there is a clearly pronounced doublets with a distance of 12 ± 1 Gauss between components, produced by the nuclear moment of the hydrogen proton.

At 12,000 Mcs the shape of the spectrum is determined essentially by the anisotropic broadening ($g_\perp \neq g_\parallel$). The derivative absorption line for 12,000 Mcs is shown in the figure. The shape of the observed line is readily explained by the presence of anisotropic broadening and the presence of hyperfine splitting. From this curve, we estimate that $g_\perp \approx 2.00$ and $g_\parallel \approx 2.03$.

*The investigation was made by us in collaboration with A. B. Tsentsiper, and the results will be published.

†Ingram[3] also observed the electronic-magnetic resonance spectrum of the radical obtained by ultraviolet irradiation of the peroxide at 9400 Mcs.

[1] Kaĭtmazov, Prokhorov, Tsentsiper, and Gorbonev, Журнал физической химии (J. of Phys. Chem.) **31**, 515 (1957).

[2] Livingston, Ghormley, and Zeldes, Chem. Phys. **24**, 483 (1956).

[3] G. J. E. Ingram, Nature **176**, 1227 (1955).

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ON ELECTRON OSCILLATIONS IN A PLASMA

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THE oscillations of the electrons in a plasma have been observed in numerous experiments, although many details of these oscillations remain obscure. Experiments with a plasma and a beam, independent of the plasma, have been described in a number of papers. To some degree there is a contradiction between the different results obtained. According to Looney and Brown,[1] regular oscillations are impossible without the formation of standing waves, while the paper by Kojima et al.[2] confirms Bohm and Gross' theory.[3]

In the present research oscillations were observed in inert gases. We could change the pres-