

be greatest for the d rather than the s metal orbitals, because the higher density of states of the former will lead to a higher electronic weight term in the ratio f_d/f_s . Dowden⁹ has recently suggested that the density of states in a metal may determine the A factor; but his suggestion that the hydrogen bond is ionic in the sense $M-H^+$ disagrees with reliable contact potential data⁷ and energy calculations¹⁰. In our opinion, the bond is essentially covalent, the ionization potential of hydrogen being too high to admit the other view.

At a later date we shall present these and other results in full, and discuss examples in the literature of poisoning of transition metal that may be ascribed to solution of hydrogen atoms in the metal. Similarly, activation procedures such as anodic oxidation may be attributed to removal of such dissolved atoms. In the meantime, we would direct attention to the possible implications of our work for studies on hydrogenation and hydrogen overvoltage.

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⁴Mott, N. F., and Jones, H., "The Properties of Metals and Alloys" (London, 1936).

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⁶Farkas, A., and Farkas, L., *J. Amer. Chem. Soc.*, **64**, 1594 (1942).

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⁸Glasstone, S., Laidler, K. S., and Eyring, H., "Theory of Rate Processes" (New York, 1941).

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¹⁰Eley, D. D. (unpublished).

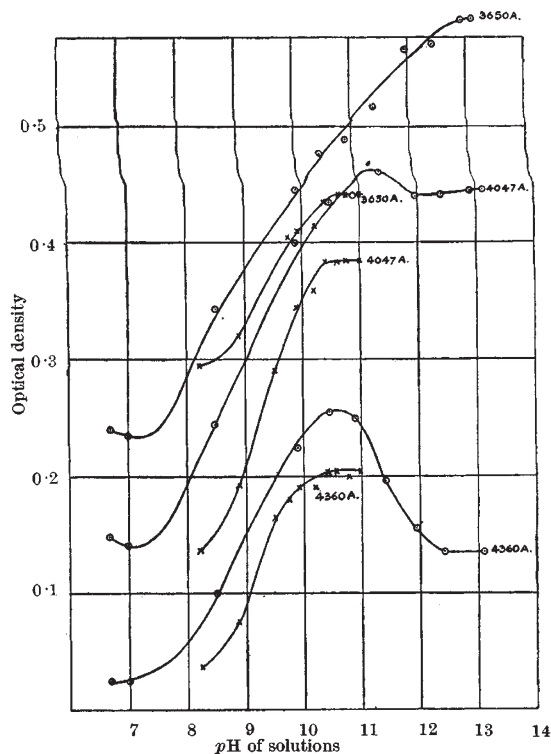
Absorptiometric Determination of Uranium

THE communication by T. R. Scott¹ raises the point of the effect of bicarbonate in the hydrogen peroxide method for the absorptiometric determination of uranium. It should be pointed out that although this particular example had not been noted previously, it is one instance of two general effects which have not been stressed in the literature referring to this method. These are that the light absorption or optical density for a given concentration of uranium with excess peroxide present is dependent (a) upon the final pH and (b) upon the particular alkali used (or if a mixture, upon the relative amounts); for example, we have shown that sodium hydroxide and sodium carbonate may give different results even at a given final pH. The accompanying graph illustrates these points.

It can also be seen from the graph that at 365 m μ the sensitivity of the method is some 25 per cent

Optical density of solutions containing 1 mgm. uranium, 0.5 ml. 20 vol. hydrogen peroxide, 1 gm. sodium bicarbonate and various amounts of other alkali in total volume of 50 ml.

| Other alkali added | pH value of final solution | Optical density (4-cm. cell) | |
|---|----------------------------|------------------------------|-------------|
| | | 365 m μ | 405 m μ |
| Nil | 9.1 | 0.282 | 0.254 |
| 10 ml. 10% NaOH | 12.95 | 0.568 | 0.403 |
| 5 ml. 10% Na ₂ CO ₃ + 10 ml. 10% NaOH | 12.9 | 0.565 | 0.395 |
| 5 ml. 10% Na ₂ CO ₃ + 5 ml. 10% NaOH | 12.4 | 0.525 | 0.400 |



○—○—, Sodium hydroxide; ×—×—, sodium carbonate
Influence of pH on optical density. Solutions represented contain 1 mgm. uranium in a total volume of 50 ml. and are measured on the Spekker using the mercury lamp and 4-cm. cell

greater at the higher pH values than at the pH of approximately 11 reached by Sandell's² conditions as used by Scott¹.

This sensitivity was achieved with a commercial filter absorptiometer using a mercury lamp source, although the details of the graph have also been checked spectrophotometrically.

It is possible to overcome the effect noted by Scott, for reasonable amounts of sodium bicarbonate, or carbonate, or both, by addition of sodium hydroxide to a pH of 12.9, as the accompanying table shows. It is hoped that a fuller account of the work mentioned here will be published elsewhere.

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¹Scott, T. R., *Nature*, **163**, 768 (1949).

²Sandell, E. B., "Colorimetric Determination of Traces of Metals" (Interscience Publishers Inc., New York, 1944).

Pyrophosphatase Activity of Brain Tissue

AN enzyme capable of hydrolysing inorganic pyrophosphate was demonstrated in muscle by Lohmann¹. It has also been found in various other tissues²⁻⁴ and organisms^{5,6}, and its properties have been examined in detail in preparations obtainable from yeast⁷ and from erythrocytes⁸. The system does not, however, appear to have been demonstrated previously in brain tissue; accordingly, it may be of interest to quote some experiments on the magnesium-activated pyrophosphatase activity of rat brain, carried out here as part of a more comprehensive investigation of brain phosphatases.