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The Influence of pH Values on the Oxidation of Ferrous Sulphate

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cause of secondary reactions at the electrode and because of the irreversibility of these electrodes. Directions are given for the preparation and analysis of pure manganese dioxide.

In a, b, and c a number of analytical methods are given, some of which are new and others improve the precision of existing analytical methods.

STATE UNIVERSITY OF IOWA,
  IOWA CITY, IOWA.

THE INFLUENCE OF PH VALUES ON THE OXIDATION OF FERROUS SULPHATE

JACOB CORNOG and ALBERT HERSHBERGER

Weighed quantities of ferrous sulfate were dissolved in buffered solutions after which the resulting buffered solutions of ferrous sulfate were aerated for three hours. The quantity of iron remaining unoxidized after three hours aeration was, in each case determined, by titrating the aerated solution with potassium permanganate solution. The degree of oxidation was found to vary both with the initial concentration of ferrous sulfate and with the PH value of the solution. These data are shown in the following table.

(1)	(2)	(3)	(4)
pH OF SOLUTION	% OXIDATION 0.1 M $FeSO_4$	% OXIDATION 0.1 M $FeSO_4$	% OXIDATION .001 M $FeSO_4$
1	0.00	0.00	0.00
2	0.00	0.00	0.00
3	0.00	0.00	0.00
4	4.28	0.00	0.00
5	44.25	25.91	2.20
6	54.85	82.19	71.64
7	76.73	93.62	94.29
10	57.64	92.94	96.03

These data indicate that under the experimental conditions used

(1) That little or no iron is oxidized in solution having a PH value less than 5.

(2) That in solutions buffered to a PH = 5 the degree of oxidation increases with increasing iron concentration, but in solutions buffered to a PH = 10 the degree of oxidation decreases with increasing iron concentration.

B. *The Influence of the Length of Time of Aeration on the Degree of Oxidation of A 0.01 M Ferrous Sulfate Solution Buffered to* PH = 5.

In the experiments here recorded different portions of the same

0.01 M ferrous sulfate solution that had been buffered to $pH = 5$ were aerated for different periods of time. After aeration each portion was titrated with potassium permanganate solution to determine the portion of iron still unoxidized. From the data thus obtained it was learned that the relation between the duration of oxidation and the percentage of iron oxidized could be expressed by the following equation.

$$\ln\ T = 0.032\ x - 0.01$$

In this equation x is the percentage of iron oxidized by aeration in T hours.

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THE DETERMINATION OF OXIDATION-REDUCTION POTENTIALS FROM EQUILIBRIUM DATA

STEPHEN POPOFF, V. B. FLEHARTY, and E. L. HANSON

The determination of the oxidation-reduction potentials is more reliable from equilibrium data than from electromotive force data. The potential of the ferric-ferrous electrode was calculated from the experimentally determined equilibrium constant of the reaction:

$$2\,Fe\,(ClO_4)_3 + 2Hg \rightleftarrows 2\,Fe\,(ClO_4)_2 + Hg_2\,(ClO_4)_2$$
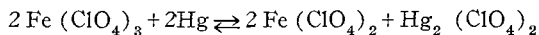
The perchlorates, mercury, and perchloric acid are better suited for the determination of the equilibrium constant than the nitrates, silver and nitric acid employed by A. A. Noyes and Braun (J. Am. Chem. Soc. 34, 1016, 1912). The true equilibrium constant of the reaction was determined by suitable experimental procedure and subsequent mathematical and graphical analysis.

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FURTHER STUDIES ON THE UTILIZATION OF AGRICULTURAL WASTES

HENRY GILMAN, R. E. BROWN, J. B. DICKEY, A. P. HEWLETT, AND G. F. WRIGHT

The syn and anti oximes of delta-benzyl furfural have been examined in connection with sweet tasting compounds. The syn is sweeter than the anti compound, and also sweeter than saccharine.