Fig. 1. $F(\alpha)$ plotted against time for 100 g calcium sulphate hemihydrate and 60 ml. water reacting at 20.5°C

Here, P is given by $F(\alpha_0)$, where α_0 is the effective fraction of gypsum at the initiation of hydration. In all these equations k characterizes the self-acceleration of hydration.

Fig. 1 shows $F(\alpha)$ plotted against time for 100 g of finely divided calcium sulphate and 60 ml. water maintained at 20.5°C. The extent of reaction was followed by chemical analysis². It is seen that the kinetics conform very well with equation 1 for experimental results covering more than 90 per cent of the course of hydration.

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Stability of Indanetrione Hydrate Solutions

THE maximum yield of the coloured complex formed by the reaction of indanetrione hydrate¹ and a compound containing an amino-group² may be obtained when a reducing substance is present in the reaction mixture. Stannous chloride³, hydrindantin⁴ or potassium cyanide⁵ may be used as a suitable reducing substance in the reaction mixture, provided the reaction occurs at a controlled pH^{3,6}.

The presence of dissolved oxygen in the reaction mixture has been reported to produce an oxidation side-reaction³. Indanetrione hydrate containing stannous chloride is an efficient reagent mixture but is unstable and deteriorates on storage. A precipitate occurs and the production of this precipitate is hastened when the solution is in contact with atmospheric oxygen. In this laboratory the indanetrione hydrate for the quantitative determination of nitrogen⁶ (as ammonia) or α -amino-acids⁷ has been prepared in small quantities immediately before use; and consistent colour factors for the α -amino-acids and amino-sugars have been obtained.

Large quantities of the reagent are required for the continuous monitoring of eluates from the automatic amino-acid analysers now in common use. The reservoir for the indanetrione hydrate reagent in the Beckman Spinco amino-acid analyser (model 120) used in this

laboratory is protected from atmospheric oxygen by aspirators which may be filled with oil or water. That arrangement has been found not to exclude atmospheric oxygen and a simple procedure has been adopted to overcome the absorption of atmospheric oxygen by the water in the aspirators and also by the indanetrione hydrate solution.

A modified Fieser⁸ solution has been added to the water in the aspirators: and the latter are protected from the atmospheric oxygen by connexion to a guard bubbler tube containing the concentrated Fieser solution. Air which replaces the aqueous solution in the aspirator is made to bubble through the strong Fieser solution, while the pump with a two-way valve operates to force the indanetrione hydrate solution into the reaction coil. The concentrated modified Fieser solution contained 1 g sodium anthraquinone β sulphonate, 10 g sodium hydroxide and 10 g sodium hydrosulphite per 100 ml. of the solution. The 4 l. of diluted Fieser solution in the aspirators contained 200 ml. of the concentrated modified Fieser reagent and was red in colour when prepared. The colour of the solution changed slowly to brown as oxygen was absorbed; but the addition of 10 g of sodium hydrosulphate restored the red colour, and served to regenerate the 4 l. of diluted Fieser solution. This procedure may be repeated several times before it is necessary to discard the diluted Fieser solution in the aspirators.

The use of oil in the aspirator bottles will not protect the indanetrione hydrate from the atmospheric oxygen. Fieser solution offers considerable protection for the indanetrione hydrate if the latter is stored for any period.

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Some Double-layer Capacity Measurements on Platinum Electrodes

FROM a series of investigations of the rest potential on bright platinum electrodes¹ in oxygen-saturated acid solutions, it was suggested that the reversible oxygen potential of 1.229 V (ref. 2) is not ordinarily observed because platinum is not inert to such an electrolyte, and the system never comes to equilibrium. The Pt-O-acid system, then, is a polyelectrode³, and the rest potential is a mixed potential⁴. It was further suggested that, if an electronically conducting surface which is inert to oxygen-saturated acid solution could be obtained, the reversible potential should be observed because, then, the system would be a simple electrode.

It was found⁵ that a platinum surface could be passivated in concentrated nitric acid and that the reversible potential was observed for extended periods of time (more than 24 h). In this work, it was proposed that the nitric acid produced a complete layer of adsorbed oxygen which was an electronic conductor and did not build up with time. In order to throw light on the nature of this passivating film, the following double-layer capacity measurements were made.

A constant current single pulse technique⁶ was used in which the differential capacity is determined from the relationship, $C = i/(dE/dt)$, where i is the current density and dE/dt is the slope of the photographed trace obtained on the oscilloscope. Apparent current density values were used in the calculation of i . The measurements were