The Rate of Evaporation through Surface Films

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tive ion, respectively, and v_+ and v_- are the numbers of moles of the two ions in one mole of the electrolyte. The mean activity is designated by $a_\pm$ and K is a constant. Lewis and Randall did not point out that Equation 3 is the solubility product law in an exact form.

In sufficiently dilute solutions, especially of uni-univalent electrolytes, the ion activities are approximately equal to their concentrations. Under such conditions concentrations can be substituted for activities in Equation 3, giving the ordinary form of the solubility product law. The latter can therefore be expected to hold when the concentrations are approximately equal to the activities and to fail when the concentrations differ appreciably from the activities.

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THE RATE OF EVAPORATION THROUGH SURFACE FILMS

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The purpose of this investigation was to study the influence of surface tension on the rate of evaporation of water through surface films. We determined the rate of evaporation of pure water and water from solutions of calcium and sodium chlorides of concentrations varying from zero to nearly saturation.

These two solutions were selected because of the tendency of Ca. to increase the surface tension and of Na. to decrease the surface tension in water solutions. A mixture of these salts was also studied because of the tendency of one to overcome the effects of the other on the surface tension. The two curves for the rate of evaporation of Ca and Na solutions were determined and an increase in concentration caused a decrease in the rate of evaporation from each solution.

If, now, to a solution of NaCl of known concentration, of which the rate of evaporation has been determined, there be added a small amount of $CaCl_2$ without changing the concentration of Na, the vapor pressure of the solution would be lowered and the rate of evaporation would be decreased if it were a function of the vapor pressure only.

On the other hand, if the rate of evaporation remained constant, or increased, it would indicate that the rate of evaporation was not solely determined by the vapor pressure. The determinations

show a slight increase in the rate of evaporation, thereby indicating that the rate of evaporation is influenced to a small degree by the surface tension of the liquid.

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THE COMMERCIAL PREPARATION OF OXYGEN FROM LIME AND CHLORINE

O. R. SWEENEY AND A. W. RALSTON

The reaction of chlorine on a suspension of lime in the presence of suitable catalysts, such as nickel, cobalt and iron salts, has been studied. It was found that the optimum temperature is 94° C.; that the greatest unit efficiency of the catalyst, nickel nitrate, is obtained at a concentration of .02 g. per 100 c.c; that the rate of generation of oxygen is almost directly proportional to the rate of flow of the chlorine and that nickel and cobalt salts are distinctly superior to all other catalysts which were used. In addition it has been found that the catalyst is not easily poisoned, and may be used throughout a number of runs.

An apparatus has been designed which is capable of producing pure oxygen from lime and chlorine, and which is capable of recovering the catalyst for further use.

By the process outlined chlorine, now a drug on the market, is converted into calcium chloride and yields oxygen, both of which are in demand. Commercial possibilities of this reaction were pointed out.

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THE RATE OF SOLUTION OF Zn IN H_2SO_4 UNDER PRESSURES UP TO 347 ATMOSPHERES

THOS. C. POULTER AND GLEN E. FRAZER

A study is made of the factors influencing the rare of solution of Zn in H_2SO_4. The conditions of the surface, the local concentration of the acid at the surface of the Zn, and the size and shape of the pieces of Zn are found to be very important factors while pressures up to 347 atmospheres have very little direct influence upon the rate of reaction.

The pressure cell used for this work was exhibited.