COMMUNICATIONS TO THE EDITOR

COAGULATION OF FERRIC OXIDE HYDROSOLS

Sir:

In a recent communication [THIS JOURNAL, **52,** 4170 (1930)] N. R. Dhar suggests that "the results of Judd and Sorum [THIS JOURNAL, **52,** 2598 (1930)] are not in agreement with previous work and need confirmation." The "previous work" referred to is that of Dhar and his collaborators, particularly that reported by Dhar and Gore [*J. Indian Chem. Soc.,* **6,** 31 (1929)], in which the conclusion is drawn that "even highly purified sols of ferric hydroxide containing very small amounts of chloride ion follow the general rule that the greater the concentration of the sol the greater is the amount of electrolyte necessary for coagulation irrespective of the valency of the coagulating ion."

If the two papers in question are compared it will be obvious that Dhar's own results, when properly analyzed, fall in line with the very conclusion with which he seems to take issue. Figure 4, page 2601, in the paper by Sorum and Judd represents graphically the influence of the addition of ferric chloride on flocculation values. If the increase in chloride content, as represented by millimoles of ferric chloride added per liter, is greater than 0.0095 g. per liter, the sol behaves as did Dhar's, *i. e.,* the flocculation value with sodium chloride increases with increased sol concentration. It is only when the added chloride is less than 0.0095 g. per liter that the sol follows the Burton–Bishop rule. An examination of Dhar's results will show that in no case is the chloride content of the purified sol anywhere nearly as low as that represented by the above figure. The best figure is 0.0936 g. per liter, ten times the critical value represented in Figure 4 cited above. As such it would seem that Dhar's criticism is not very well founded.

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DERIVATIVES OF OPTICALLY ACTIVE TRIARYLCARBINOLS AND THEIR HALOCHROMIC SALTS

Sir:

In a recent article published in the *Proceedings of the National Academy of Sciences* [**16,** 215 (1930)], I described a method for preparing an optically active triarylcarbinol in the form of its thioglycolic acid derivative. *l*-Phenylbiphenyl-α-naphthylmethylthioglycolic acid, $(C_6H_5C_6H_4)(C_{10}H_7)(C_6H_5)C$—$SCH_2COOH$ (hereafter designated as A), has the following specific rotation in carbon tetrachloride, $[\alpha]_D^{20}$ $-13.63°$. Experiments with this substance show that it forms halochromic salts. Concentrated

sulfuric acid, perchloric acid, and mercuric chloride unite with it, forming deep violet halochromic compounds, which on pouring into ice water yield the carbinol, $(C_6H_5C_6H_4)(C_{10}H_7)(C_6H_5)C$—OH, in its optically inactive form. A solution of titanium tetrachloride in chloroform when added to a chloroform solution of A produces a deep violet halochromic salt which on decomposition with water yields A in its racemic form. However, when a solution of ferric chloride in glacial acetic acid is added to a chloroform solution of A, the deep violet halochromic salt so formed, on pouring into ice water, produces the original *l*-phenylbiphenyl-α-naphthylmethyl-thioglycolic acid with no racemization.

The fact that the halochromic salt with ferric chloride on decomposition with water gives the original optically active thioglycolic acid derivative with no change in specific rotation is compelling evidence against quinoid formulation for the explanation of color. A detailed account of these experiments will be published shortly.

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THE VELOCITY OF ADSORPTION PROCESSES AND THE PROBLEM OF PRO-MOTER ACTION

Sir:

In a recent note [THIS JOURNAL, **52**, 5298 (1930)] and in greater detail in a communication to the February issue of THIS JOURNAL, the data relative to the concept of activation energy of adsorption processes has been indicated. In these contributions it was emphasized that the magnitude of the activation energy and, hence, of the velocity of adsorption at a given temperature, is determined not only by the adsorption process in question but also by the nature of the surface area on which the process occurs. We can now record some striking examples of this view which bear fundamentally on the problem of promoter action in catalysis. We have found that on an active manganous oxide catalyst hydrogen is adsorbed immeasurably slowly at 0 and 100°. At 184° the initial rate of absorption in a given adsorption system was 8 mm. per hour. At 305° the velocity of adsorption had risen to 78 mm. per hour, which corresponds to an activation energy in the neighborhood of 10,000 calories. The hydrogen was reversibly adsorbed since it could be recovered quantitatively by evacuation at higher temperatures. To compare these data with a promoted catalyst we have now studied a manganous oxide–chromium oxide catalyst. This again shows an extremely slow rate of adsorption at 0°, but at 184°, in a system comparable to that used with manganous oxide, the velocity of adsorption had risen to approximately 100 mm. per *minute*. The velocity of adsorp-