

CHROMIC ACID AND THE ANALOGOUS REACTIONS

The difficulty of inventing any hypothetical mechanism to explain the part played by the bichromate is enhanced by the circumstance that this case stands alone. Mr. Dushman¹ has shown that potassium bichromate is without action on the rate of the reaction between iodic and hydriodic acids; and by means of a few measurements I have ascertained that the rates of the reactions between

Iodic and hydrobromic acids
Bromic and hydrobromic acids
Chloric and hydrobromic acids and
Chloric and hydriodic acids

are likewise uninfluenced by the presence of potassium bichromate.

Summary

(1) Addition of potassium bichromate to a solution containing bromic and hydriodic acids brings a new reaction into operation, which consists in the liberation of iodine at a rate proportional to the concentrations of the bromate, iodide, bichromate and acid, without reduction of the bichromate. The normal reaction, whose rate is proportional to the concentration of the bromate and iodide and to the square of that of the acid, goes on unaffected by the presence of the bichromate.

(2) The processes of oxidation of hydriodic and hydrobromic acids by the oxyacids of the halogens, other than that of hydriodic by bromic acid, are not affected by the presence of potassium bichromate. Although in other respects the members of this group of reactions resemble one another closely from the kinetic point of view as well as from that of pure chemistry, the analogy fails at this point.

In both respects this case of catalysis is unique.

I desire to express my thanks to Prof. W. Lash Miller, under whose direction these measurements were carried out in the winter of 1904-5.

¹ Jour. Phys. Chem., 8, 453 (1904).
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February, 1907