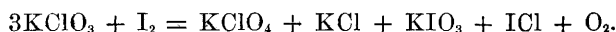


LXXX.—*Note on the Interaction of Iodine and Potassium Chlorate.*

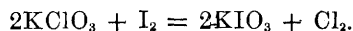
By T. E. THORPE, F.R.S., and GEORGE H. PERRY, Assoc. Roy. Coll. Science.

THE interaction of iodine and potassium chlorate, first employed by Berzelius for the preparation of iodine monochloride, is usually represented by the equation



We find, however, that when an intimate mixture of iodine and potassium chlorate, in the proportions demanded by the above equation, is heated, not only is the yield of iodine monochloride invariably very far below the theoretical amount, but that much of what actually is formed is converted into the solid trichloride, and that free chlorine and more or less iodic anhydride are often simultaneously formed. These facts seem to show that the actual change is very imperfectly indicated by the equation above given.

Careful quantitative experiments, so arranged that the various products of the change, both fixed and volatile, could be estimated, have shown that, in reality, the primary and main reaction between iodine and potassium chlorate is a simple metathesis:—



The chlorine so liberated attacks any iodine that is not within the "sphere of action" of the heated chlorate, and forms more or less mono- and tri-chloride of iodine, in amounts depending upon the temperature and mode of heating. When care is taken not to heat the mixture to a higher temperature than is actually necessary to effect the above change, the saline residue contains only traces of potassium chloride and perchlorate, which seems to indicate that these substances are not really products of the direct action, but are formed by local superheating of the chlorate, with evolution, of course, of oxygen, and consequent formation of iodine pentoxide. By careful management, it is possible to convert practically the whole of the iodine present into potassium iodate, with the liberation of the equivalent amount of gaseous chlorine.

Iodine monochloride, as is well known, is readily dissociated by heat into the trichloride and free iodine. It seemed to us interesting to determine whether a solution of iodine monochloride in chloroform or carbon tetrachloride would show any indication of such dissociation when allowed to diffuse into a quantity of the same solvent.

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The experiment indicated that no such dissociation occurred, but that the ratio of iodine to chlorine remained unchanged throughout the mass of the solution, a conclusion in harmony with the results of recent work by Stortenbeker (*Zeit. physikal. Chem.*, **10**, 183).
