Iodine Clock

AKA: Instant Coke, Instant Wine, 30-second Coke

Potassium persulphate is used to oxidize iodide ions to iodine, in the presence of starch and a small amount of thiosulphate ions. When the thiosulphate is exhausted (by reaction with the iodine produced), the dark blue iodine-starch complex is formed. The time taken for the blue colour to appear varies with rate of reaction and can be used to study the reaction kinetics. For the purposes of this video, the reaction is catalysed by Fe^{2+} ions to drastically shorten the time for the color change to occur.

Introduction

Reaction

This reaction starts from a solution of hydrogen peroxide with sulfuric acid. To this is added a solution containing potassium iodide, sodium thiosulfate, and starch. There are two reactions occurring in the solution. In the first, slow reaction, the triiodide ion is produced .

$$H_2O_2(aq) + 3\ I^-(aq) + 2\ H^+ \rightarrow I_3^- + 2\ H_2O.$$

In the second, fast reaction, triiodide is reconverted to iodide by the thiosulfate.

$$I_3^-(aq) + 2\ S_2O_3^{2-}(aq) \rightarrow 3\ I^-(aq) + S_4O_6^{2-}(aq)$$

The iodine in then observed via the reaction with starch.

Outside Links