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Stability of chlorine dioxide in aqueous solution

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Abstract

Chlorine dioxide in unbuffered aqueous solution at pH 9 and 25°C decomposes to chlorate, chlorite, chloride and oxygen by coupled slow and rapid reactions. The initiation of the second rapid decomposition depends on the initial chlorine dioxide concentration and ionic strength of the solution. Chloride ion has a catalytic and inhibiting effect, changing the product distribution to a 1:1 molar ratio of chlorate and chlorite, thus increasing the oxidizing potential of chlorine dioxide. In buffered solutions at pH 8.8 the reaction is pseudo-second order, yielding chlorate and chlorite as products.