

ABSTRACT

The hydroxide ion substitution and aquation reactions of the acidopentamminecobalt (III) ion have been reviewed.

The value of the acid dissociation constant of the aquopentamminecobalt (III) ion has been determined spectrophotometrically and by electrometric titrations, and its relevance to kinetic studies on the acidopentamines of cobalt (III) and the correspondence with previous results have been discussed.

The kinetics of the hydroxide ion substitution of ammonia in the aquopentamminecobalt (III) ion in hydroxide ion solutions have been examined. It is suggested that above 20°C, the reaction is significant enough to be considered in kinetic studies of base substitutions in the acidopentamines of cobalt (III).

Most kinetic studies have been done on the divalent acidopentamminecobalt (III) ions, but in this work the univalent thiosulphatopentamine cobalt (III) complex was investigated. In solutions containing hydroxide ions, simultaneous aquation and base substitution reactions were indicated. Base substitution studies were made at low ionic strengths, and the data obtained were in good agreement with the Bronsted-Bjerrum theory for reactions between ions whose charge product is -1, after corrections were made on the assumption that aquation and base substitution reactions occurred simultaneously. High values of the kinetic parameters