Periodate Oxidation of Tris-(4,4'- Dimethyl-2.2' Bipyridine) iron (ii).

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Abstract:

This work covers the periodate oxidation of tris-(4,4'-dimethyl-2,2'-bipyridine) iron (II) complex. The reactive periodate species postulated from the ionic strength dependence in acid medium are $IO3^{+}$ H_6IO_6 or $I(OH)_6^{+}$. In both acid and neutral med the ionic strength dependence of observed rate constant was found to fit into Bronsted Bjerrum Christiansen formulation while in alkaline medium significant deviation was observed.

In acid medium, a reaction order of 0.2 obtained with respect to the periodate ion species shows that the reaction proceeds via a complex mechanism. The reaction was found to be acid dependent, and protonation of the periodate or complex occurs prior to electron transfer and the reaction proceeds by outer-sphere mechanism.

In alkaline medium, the formation of mesoperiodate and other polymeric species for which the accompanying equilibria are not precisely known makes the reaction more complex and the postulation of a reasonable mechanism impossible.

In neutral medium as in acid medium, reaction proceeds through the formation of an outer-sphere complex.
At low periodate ion concentration, a stoichiometry of 1:1 with respect to the complex and periodate was obtained while at high periodate ion concentration the stoichiometry is 3:1.

Keywords: Oxidation/ periodate/ reactive agents/ acidic medium/ neutral medium

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