

Effect of phenanthroline substituents on the rate of oxygen uptake by copper(I) complexes

Arce, J. A.

Spodine, E.

Zamudio, W.

The values of the rate constant for the oxidation reaction are reported for a series of substituted bis(phenanthroline)copper(I) complexes. The rate constant increases along the series: 2,9-diCH₃ phen < 5-Cl phen < phen < 5-CH₃ phen < 4,7-diC₆H₅ phen < 5,6-diCH₃ phen. A correlation is developed between the experimental rate constants obtained and the acid dissociation constants for the ligands. The reaction fits a Hammett linear free energy relationship with $\rho_{\text{variant}} = -0.71$. The rate determining step in each reaction is attributed to the electron transfer to the oxygen molecule, which is influenced principally by changes in electron density at the metal site. © 1976.