Asian Journal of Chemistry Vol. 4. No. 4 (1992), 948-949

NOTES

Spectrophotometric Determination of Step-wise Formation Constants of the Molybdenum Complex with Phenylhydroxylamine

V.K. SWAMI* AND R.P. TYAGI

Department of Chemistry
University of Rajasthan, Jaipur-302001, India

The determination of step-wise formation constant for molybdenum phenylhydroxylamine complex has been described.

In this paper the determination of step-wise formation constant for molybdenum phenylhydroxylamine (PHA) complex has been described. The system of the complicated equation along with their intercepts were solved with CDC 3600 computer for simulatneous solution through FORTRAN programming. The trends in stability constant have been discussed.

Photometric Procedure: To a suitable aliquot of molybdenum (VI) solution (1.076×10^{-3} M) were added varying amounts of reagents solution and required amount of hydrochloric acid so as to maintain the acidity at 3M. The turbidity of the solution was removed by adding 12·5 ml of purified phenylhydroxylamine. After thorough mixing the solution was allowed to attain room temperature. The absorbance measured at 565 nm were plotted against mole fraction of molybdenum. Photometric data were utilised for the evaluation of successive and step-wise formation constants. The method of calculation has been reported earlier[1].

The charge transfer (CT) spectra of Mo-PHA complex extends upto visible range which seems otherwise impossible for investigation with nitrogen reagents selectively. Without the use of highly charged heavy cation for isolating in solid state, the composition has been confirmed to the 1 : 4 in solution of applying continuous variation and mole ratio methods.

The values of the step-wise stability constant at 25°C are as follows: Log K_1, 3.45; Log K_2, 4.25; Log K_3, 3.56; Log K_4, 4.57. The constants show a nearly uniform trend with the exception of K_3 value. A reversal in the trend indicates greater involvement of properties other than the degree of complex formation. K_1 is attributed due to natural species formed by molybdenum ion. K_2 value corresponds to natural monomolybdenum species. K_3 value is stability constant of the neutral complex Mo $(PHA)_6$ of molybdenum (VI) ion. Molybdenum chelates are likely to be more stable and have reverse trend in the stability values. The 1 : 4

anionic complex Mo $(PHA)_4^{2-}$ has the highest stability constant. The extra stability is due to increased number of chelates ranges, complete environment by nitrogen atoms and finally formation of a highly stable structural configuration and geometry.

ACKNOWLEDGEMENTS

The authors acknowledge the financial support from Department of Science and Technology, Rajasthan.

REFERENCES

1. J. E. Land and N. M. Morris, *J. Less-common Met.*, **8**, 266 (1265).

[*Received*: 29 June 1991; *Accepted*: 15 July 1991] AJC-378