

Solvent Effects on Complexation of Nitrilotriacetic Acid with Molybdenum(V) in Different Aqueous Solutions of Methanol

K. Zare^{C, S}

*Chemistry Department, Islamic Azad University, Tehran, Hesarak, Iran
kzare110@hotmail.com*

F. Gharib

Chemistry Department, Shahid Beheshti University, Tehran, Evin, Iran

The influence of solvent on solute molecule has been intensively studied but the problem is yet far from being completely understood. Chemists are usually interested to understand solvent effects on the overall solution capabilities that depend on all possible intermolecular interactions between solute and solvent molecules. In the present work the formation constants of the species formed in the systems H^+ Mo(VI) nitrilotriacetic acid and H^+ nitrilotriacetic acid have been determined in different aqueous solutions of methanol at 25 °C and constant ionic strength 0.1 mol dm⁻³ sodium perchlorate using spectrophotometric and potentiometric techniques. The composition of the complex was determined by the continuous variations method. It was shown that molybdenum(VI) forms a mononuclear 1:1 complex with nitrilotriacetic acid at pH=5.8. The formation constant in various media was analyzed in terms of Kamlet and Tafts parameters. Single-parameter correlations of the formation constant versus hydrogen-bond donor acidity percentage and dipolarity/polarizability are poor in all solutions, except for hydrogen-bond acceptor basicity, but multi-parameter correlations represent significant improvement with regard to the single-parameter models. Linear relationship is observed when the experimental stability constant is plotted versus the calculated ones, while all the Kamlet and Tafts parameters are considered. Finally the results are discussed in terms of the effect of solvent on complexation [1-4].

- [1] F. Gharib, K. Zare, and B. Mohammadi, *J. Mol. Liq.* in press, (2005)
- [2] K. Majlesi, K. Zare, and F. Teimouri, *J. Chem. Eng. Data.*, **48**, 680 (2003)
- [3] M.J. Kamlet, J.M. Abboud, M.H. Abraham, and R.W. Taft, *J. Org. Chem.*, **48**, 2877 (1983)
- [4] K. Zare, P. Lagrange, and J. Lagrange, *J. Chem. Soc. Dalton Trans.*, 1372 (1979)