Complexometric Titration of Co(II) with EDTA Using Succinimide as Indicator

Komplexometrische Titration von Co(II) mit ÄDTA unter Verwendung von Succinimid als Indicator

C. L. SHARMA

University of Roorkee (India)

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Succinimide reacts with Co(II) in ammoniacal medium to form a deep violet-blue soluble 1:4 (cobalt/succinimide) complex [3]. In course of my study on this reaction, it has been found that succinimide serves as a specific indicator for the complexometric determination of Co(II) by EDTA titration. This method has the advantages of being very sensitive, specific and less interfering over the existing methods, besides, it gives a very sharp end point unlike some of the well known reagents [1,2,4] where the end point drags on.

Standardized solutions of Co(II) nitrate were titrated against EDTA (disodium salt) at room temperature at pH 10 (range 9.5–11). 0.5 g of succinimide with two drops of strong ammonia was used as indicator. The colour change at the end point was from violet blue to light brown. Better end points are obtained if a small amount of sodium dichromate is added with succinimide. (Colour change from deep-violet blue to yellow.) The concentrations of the Co(II) solutions should be in the range of 200 to 3000 ppm. Every ml of 0.01 M EDTA corresponds to 0.68 mg of cobalt.

Solutions containing known amounts of Co^{2+} (1000 ppm) and varying amounts of foreign ions were prepared and Co^{2+} determined by the above method. Na^+ , K^+ , Rb^+ , Tl^+ , Ag^+ , Zn^{2+} , Ba^{2+} , Sr^{2+} , Mg^{2+} , UO_2^{2+} , VO_2^{2+} , B^{3+} , Cl^- , Br^- , I^- , NO_2^- , NO_3^- , CH_3COO^- ions do not interfere with the determination even when present in a hundred times the cobalt concentration. As^{3+} (400 ppm), Sb^{3+} (400 ppm), Mo^{6+} (500 ppm), W^{6+} (500 ppm), SCN^- (900 ppm), ClO_4^- (900 ppm), AsO_4 (500 ppm) do not interfere in the concentrations stated. Be^{2+} , Mn^{2+} , Hg^{2+} , Bi^{3+} , Ce^{4+} , Th^{4+} , Zr^{4+} and Hf^{4+} ions undergo hydrolysis at the pH of titration and do not interfere when present in 100 ppm concentration. However, Fe^{3+} , Cr^{3+} and CN^- were found to interfere even in traces. Interferences caused by the following ions can be eliminated by addition of the reagents given in parenthesis; the maximum amount tolerable using these masking reagents is also incorporated: Ca^{2+} , Al^{3+} , Ti^{3+} (sodium fluoride; 500 ppm), Cu^{2+} (sodium thiosulphate or ascorbic acid; 1000 ppm), $\text{C}_2\text{O}_4^{2-}$ (calcium carbonate and then sodium fluoride; 200 ppm), Cd^{2+} , Pb^{2+}

(2-mercapto benzothiazole, 900 ppm). Interference due to Ni^{2+} may be eliminated by its preliminary separation with dimethylglyoxime in ammoniacal medium.

The relative stabilities of the ammine and succinimide complexes of cobalt are such that the indicator complex is broken down by excess of ammonia. Ammonia is added in such an amount that the required pH is maintained (9.5–11) during the course of the titration.

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Dr. C. L. Sharma
Vikasnagar, Residence 150/8
University of Roorkee
Roorkee, India

Indirect Titrimetric Determination of Glucose Using Fehling's Solution and EDTA

Indirekte volumetrische Glucosebestimmung mit Hilfe von Fehlingscher Lösung und ÄDTA

T. S. B. NARASARAJU, V. L. N. RAO and R. P. SINGH
Department of Chemistry, Banaras Hindu University
Banaras, India

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The earlier methods [1,3] for the determination of glucose based primarily on the reduction of Fehling's solution and the subsequent iodometric determination of either the reduced or the surplus copper were found to be of limited accuracy. The present work has been an attempt to investigate the suitability of complexometric determination of the reduced copper.

Procedure. Solutions were prepared in double-distilled water tested previously for the absence of Ca^{2+} . To a convenient volume of a standard solution of glucose containing not more than ~ 30 mg were added 5 ml each of Fehling's solutions A and B and then diluted to 50 ml with water. The mixture was heated on a boiling water-bath for exactly 20 min avoiding bumping, cooled and the cuprous oxide formed was filtered through a 1G4 crucible, washed repeatedly with water till freed from Cu^{2+} , dissolved in a