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NOTE

Conductometric Estimation of Binary Mixture of Metal Ions Involving Ag^+ Ion with Ni^{2+}/Co^{2+} Ion

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In the present communication, the conductometric estimation of binary mixture of metal ions has been described.

The binary mixture of Ni^{2+} and Ag^+ ions present in a solution has been estimated conductometrically using EDTA and HCl solutions[1, 2]. When the mixed solution is conductometrically titrated using EDTA as titrant then Ni^{2+} ions form an insoluble complex causing decrease in the conductance value while Ag^+ ions remain unaffected. In another conductometric titration while using HCl solution as titrant Ag^+ ions get precipitated causing decrease in conductance value.

A similar procedure has been followed when a binary mixture containing Co^{2+} ion instead of Ni^{2+} ion is taken along with Ag^+ ions. The observations have been reported in Table-1.

TABLE-1
DETAILS OF CONDUCTOMETRIC TITRATIONS OF BINARY MIXTURE OF METAL IONS

S. No.	In conductivity cell	Solution from burette	End point
1. (i)	(a) 15 mL M/40 $Ni(NO_3)_2$ + 15 mL M/40 $AgNO_3$ + 2 mL buffer solution	M/20 EDTA solution (for Ni^{2+} ions)	7.6 mL
	(b) 15 mL M/40 $Ni(NO_3)_2$ + 15 mL M/40 $AgNO_3$	M/20 HCl solution (for Ag^+ ions)	7.5 mL
(ii)	(a) 15 mL M/60 $Ni(NO_3)_2$ + 15 mL M/60 $AgNO_3$ + 2 mL buffer solution	M/30 EDTA solution (for Ni^{2+} ions)	7.5 mL
	(b) 15 mL M/60 $Ni(NO_3)_2$ + 15 mL M/ 60 $AgNO_3$	M/30 HCl solution (for Ag^+ ions)	7.7 mL
(iii)	(a) 15 mL M/80 $Ni(NO_3)_2$ + 15mL M/80 $AgNO_3$ + 2 mL buffer solution	M/40 EDTA solution (for Ni^{2+} ions)	7.6 mL
	(b) 15 mL M/80 $Ni(NO_3)_2$ + 15 mL M/80 $AgNO_3$	M/40 HCl solution (for Ag^+ ions)	7.7 mL

S. No.	In conductivity cell	Solution from burette	End point
2. (i)	(a) 15 mL M/40 $Co(NO_3)_2$ + 15 mL. M/40 $AgNO_3$ + 2mL Buffer solution	M/20 EDTA solution (for Co^{2+} ions)	7.6 mL
	(b) 15 mL M/40 $Co(NO_3)_2$ + 15 mL M/40 $AgNO_3$	M/20 HCl solution (for Ag^+ ions)	7.2 mL
(ii)	(a) 15 mL M/60 $Co(NO_3)_2$ + 15 mL M/60 $AgNO_3$ + 2 mL buffer solution	M/30 EDTA solution (For Co^{2+} ions)	7.2 mL
	(b) 15 mL M/60 $Co(NO_3)_2$ + 15 mL M/60 $AgNO_3$	M/30 HCl solution (for Ag^+ ions)	8.0 mL
(iii)	(a) 15 mL M/80 $Co(NO_3)_2$ + 15 mL M/80 $AgNO_3$ + 2 mL buffer solution	M/40 EDTA solution (for Co^{2+} ions)	7.5 mL
	(b) 15 mL M/80 $Co(NO_3)_2$ + 15 mL M/80 $AgNO_3$	M/40 HCl solution (for Ag^+ ions)	7.0 mL

The conductometric method has been found to be suitable for the estimation of metal ions when present in a mixed solution if suitable titrant is used. The titrant used must form an insoluble complex with one of the metal ions while other metal ion remains unaffected.Conductance value has been found to show a decreasing trend in the beginning and thereafter an increasing trend. Thus end point related to metal ion forming insoluble complex can be found out. The percentage error in the present work has been found to vary from ± 2–4%.

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