Compositions of Some Azole Complexes: Conductivity Method

K.P. Soni and I.M. Bhatt

Chemistry Department, University School of Sciences,
Gujarat University, Ahmedabad 380009 INDIA

The compositions of metal complexes with some azoles have been determined conductometrically. The azoles employed were sodium 2-mercaptobenzothiazole (Na-MBT) and sodium 1,2,3 benzotriazole (Na-1,2,3BTA). The metals employed were ions of Zn, Cd, Cr, Ni, Ag, Mn and Fe (ous).

EXPERIMENTAL

Solutions of $ZnSO_4$, $CdSO_4$, $CrCl_3$, Ni $(NO_3)_2$, $CuSO_4$, $FeSO_4$ of 0.05 M were prepoared and standardized by standard methods(1). Concentration of the ligand solution Na-MBT and Na-1,2,3, BTA - was 0.1 M.

An aliquot of (5ml) of each metal ion solution was titrated conductrometrically with 0.1 M ligand solution. Conductivity water was used through out the experiments. Systronics conductivity meter was used for measurements.

RESULTS

The titration graphs are given in Fig 1 and 2. The break in the curves indicate the stoichiometry of the metal-ligand complex. This is summerised in Tables 1 and 2.

TABLE 1

RESULTS OF TITRATION USING 5 ml OF 0.05 M SOLUTION OF EACH METAL SOLUTION TITRANT USED IS 0.1 M SOLUTION OF LIGAND Na-MBT

No.	Metal ion	Volume of Na-MBT	Ratio of Metal:Ligand	Complex formed
1	$ZnSO_4$	5.0	1:2	$Zn(MBT)_2$
2	$AgNO_3$	2.5	1:1	Ag(MBT)
3	$CdSO_4$	5.0	1:2	$Cd(MBT)_2$
4	$CrCl_3$	5.0	1:2	$Cr(MBT)_2$
5	$Ni(NO_3)_2$	5.0	1:2	$Ni(MBT)_2$
6	$CuSO_4$	5.0	1:2	$Cu(MBT)_2$

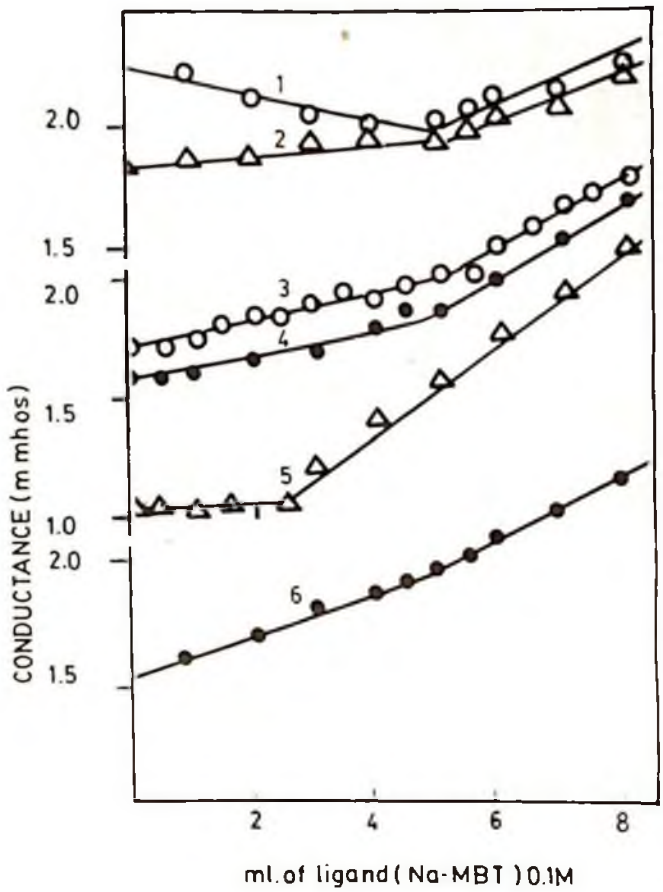


Fig. 1 Titration graphs using 5ml of 0.05M metal solution.

1. $CrCl_3$
2. $Ni(NO_3)_2$
3. $ZnSO_4$
4. $CdSO_4$
5. $AgNo_3$
6. $CuSO_4$

It can be concluded from the above that silver forms 1:1 complex with both ligands and the other metal ions studied form 1:2 complexes both the ligands.

TABLE 2

RESULTS OF TITRATION USING 5 ml OF 0.05 M SOLUTION OF EACH METAL SOLUTION TITRANT USED IS 0.1 M SOLUTION OF LIGAND Na-MBT

No	Metal ion	Volume of Na, 1,2,3 BTA	Metal:Ligand	Composition of the complex
1	$ZnSO_4$	5.0	1:2	$Zn(BTA)_2$
2	$AgNO_3$	3.0	1:1	Ag(BTA)
3	$CdSO_4$	5.0	1:2	$Cd(BTA)_2$
4	$FeSO_4$	5.0	1:2	$Fe(BTA)_2$
5	$CoSO_4$	5.0	1:2	$Co(BTA)_2$
6	$MnCl_2$	5.0	1:2	$Mn(BTA)_2$
7	$CuSO_4$	5.0	1:2	$Cu(BTA)_2$

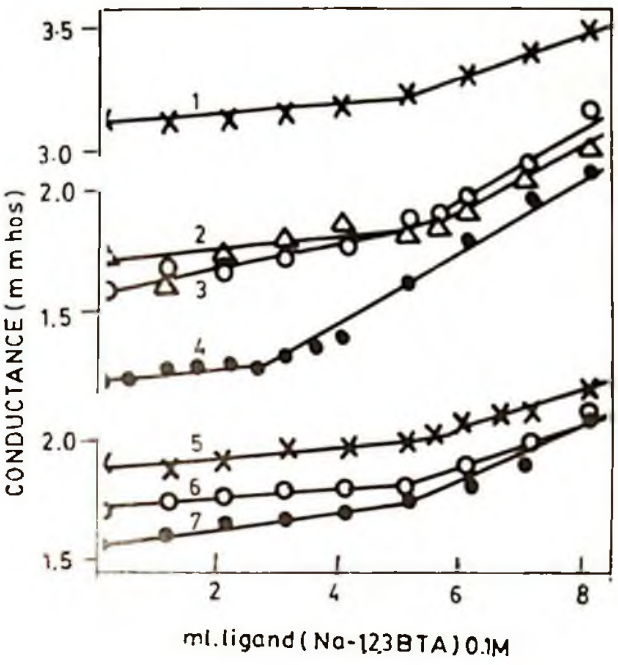


Fig. 2 Titration graphs using 5ml of 0.05M metal solution

1. $FeSO_4$
2. $CdSO_4$
3. $CuSO_4$
4. $AgNO_3$
5. $CoSO_4$
6. $MnCl_2$
7. $ZnSO_4$