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SHORT NOTES

Compounds of Antimony Trichloride with other Metal Chlorides in Non-aqueous Medium

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Although several compounds of antimony trichloride with other metal chlorides have been prepared in aqueous medium, practically no work has been done in organic solvents. By the interaction of KCl and $SbCl_3$ Miyake[1] obtained $2KCl.SbCl_3$ and $7KCl.3SbCl_3$, though according to Jordis[2], the only true compound is the former one. CsCl and $SbCl_3$ react to furnish $2SbCl_3$. $3CsCl$[3], $CsSbCl_4$[4], $3CsCl.2SbCl_3$[5], and $SbCl_3.6CsCl$[6]. By the interaction of $SbCl_3$ and the respective metal chlorides Sauciuc[7] prepared $Zn(SbCl_6)_2.5H_2O$, $17CdCl_2.SbCl_3.18H_2O$, $17CoCl_2.SbCl_3.3H_2O$ and Bendict[8], $SbCl_3.CaCl_3.8H_2O$. With PCl_5 and excess of $SbCl_3$ in $CHCl_3$ Kolditz[9] obtained $P_2Cl_{10}.4SbCl_3$. Saunders[10] prepared $SbCl_3.RbCl$ and Wheeler[11], $2SbCl_3.RbCl.H_2O$.

The compounds reported have been prepared by different methods:

(1) Chlorides of Li, Na, K, Ba, and Sr were suspended in acetone and those of NH_4, Ca, and Mg in ethyl acetate and $SbCl_3$ added, when these dissolved slowly. On addition of anhydrous benzene, the compounds were precipitated.

(2) On adding ethanolic solutions of $CuCl_2$, $CdCl_2$, and $ZnCl_2$ to $SbCl_3$ in ethyl acetate, the compounds were precipitated.

(3) On mixing the solutions of $HgCl_2$ and $SbCl_3$ in ethyl acetate and concentrating, the compound was obtained.

(4) On adding excess of $SbCl_3$ to Hg_2Cl_2 in ethyl acetate and shaking for 48 hr., the compound was isolated.

In all the cases compounds formed were dried over fused $CaCl_2$ in a vacuum desiccator and analysed by standard methods. Li, Na, and K were found by difference.

All the compounds formed are colorless, except that obtained with $CuCl_2$ (which is greenish), insoluble in common organic solvents, but dissolve in mineral acids. All the compounds are fairly stable in dry atmosphere, but are decomposed by water.

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11. *Z. anorg. Chem.*, 1894, **5**, 253.

TABLE I

Compounds of antimony trichloride with metal chlorides.

No.	Other chlorides.	%Antimony.		%Chlorine.		%Other metals.		Probable formula.
		Found.	Reqd.	Found.	Reqd.	Found.	Reqd.	
1.	Lithium	37.89	38.90	57.15	56.69	4.96	4.47	$Li_2[SbCl_5]$
2.	Sodium	34.54	35.27	51.77	51.40	13.69	13.32	$Na_2[SbCl_5]$
3.	Potassium	31.57	32.36	47.01	47.16	21.42	20.72	$K_2[SbCl_5]$
4.	Ammonium	35.73	36.43	53.73	53.09	10.54	10.76	$(NH_4)_2[SbCl_5]$
5.	Calcium	36.17	35.88	52.97	52.31	11.26	11.78	$Ca\ [SbCl_5]$
6.	Barium	27.54	27.91	41.03	40.68	31.02	31.40	$Ba\ [SbCl_5]$
7.	Strontium	31.69	31.48	46.72	45.87	22.11	22.62	$Sr\ [SbCl_5]$
8.	Magnesium	37.14	37.06	55.75	54.84	6.90	7.51	$Mg\ [SbCl_5]$
9.	Cadmium	30.16	29.82	42.87	43.17	27.04	27.30	$Cd\ [SbCl_5]$
10.	Cupric	35.18	33.65	48.82	48.92	18.03	17.50	$Cu\ [SbCl_5]$
11.	Mercurous	17.58	17.41	25.10	25.38	57.79	57.19	$Hg_2[SbCl_5]$
12.	Mercuric	25.07	24.39	34.47	35.54	39.58	40.05	$Hg\ [SbCl_5]$
13.	Zinc	32.51	33.39	47.88	48.67	18.01	17.92	$Zn\ [SbCl_5]$

Chlorides of Li, Na,K, Sr, and Ba, which are insoluble in acetone, and those of NH_4, Ca, and Mg, which are insoluble in ethyl acetate, dissolve in presence of $SbCl_3$, showing compound formation. The results show that two molecules of the chloride of a monovalent and one of a divalent metal combine with one molecule of $SbCl_3$. The compounds formed may be represented as $M_2^{+}\ [SbCl_5]^{2-}$ and $M^{2+}\ [SbCl_5]^{2-}$.

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