MICRO-DETERMINATION OF NIOBIUM(V) AND TANTALUM(V) IN NON-AQUEOUS MEDIA BY POTENTIOMETRIC METHOD

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Niobium and tantalum have been estimated by gravimetric, photometric and polarographic methods using various reagents [1-6]. Since niobium and tantalum salts hydrolyse easily in aqueous media, their direct estimation in such media presents some difficulty. Many niobium compounds are soluble in non-aqueous media but their estimation by conventional methods takes time. In the present communication 3-Amino pyrazine-2-carboxylic acid has been used for potentiometric determination of Nb(V) and Ta(V) in non-aqueous media, since there is a sharp change in potential at the equivalence point which corresponds to 1:2 and 1:1 metal to ligand ratio for Nb(V) and Ta(V) complex respectively.

EXPERIMENTAL

PH and potential measurements were carried out on Toshniwal CL43 pH-meter having combined glass calomel electrode. Micro burette having 0.01 ml subdivision was used for volume measurements.

Preparation of Solution

Stock solutions of Nb(V) and Ta(V) were prepared by dissolving $NbCl_5$ and $TaCl_5$(Fluka) in distilled DMF and the metals estimated gravimetrically. 0.01 M solution of 3-Aminopyrazine-2-carboxylic acid was also prepared by dissolving calculated amount in distilled DMF. These solution were further diluted as required.

Both direct and reverse titration were carried out. 10, 5 and 2.5 mM solution of Nb(V) or Ta(V) were used in direct titration and 1, 0.5 and 0.25 mM solution in the reverse titration.

Concentration of the solution in the burette was kept ten times more than that of the solution in the cell. A sharp change in the potential was observed at the equivalence point. The end point was obtained by ploting the curve representing $\Delta E/\Delta V$ against the volume added and corresponds to 1:2 and 1:1 metal to ligand ratio for the Nb(V) and Ta(V) complex respectively.

Results of some estimations are given in Table 1.

TABLE 1

ESTIMATION OF Nb(V) AND Ta(V) IN D.M.F.

Sl. No.	Nb(V) mg			Ta(V) mg		
	taken	found	error	taken	found	error
1.	2.325	2.315	0.43	9.050	9.013	0.40
2.	1.162	1.157	0.43	4.525	4.543	0.39
3.	0.581	0.579	0.34	2.262	2.253	0.39

Interference by Foreign Ions

Nb(V) and Ta(V) can be estimated separately in presence of Cr^{6+}, Mn^{7+}, Co^{3+} and Ni^{2+} but Ti^{4+} and Fe^{3+} interfere. W^{6+} interferes with Ta(V) but does not interfere with Nb(V). The two metals can be estimated separately in their non-aqueous solutions but interfere with each other.

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REFERENCES

1. M. Sankar Das, CH Venkateswarlu and V.T. Alhavale, *Analyst*, **81** (1956) 239.

2. J.B. Hcadrige and M.S. Taylor, *ibid.*, **87** (1962) 43.

3. G. Ackermann and S. Koch, *Talanta*, 9 (1962) 1015.

4. M.R. Narkheda, Yogendu Sharma, G.C. Shivahare, *Bangaladesh, J. Sci. Ind. Res.* **16 (1-4)**, (1981) 28-9.

5. A.M. Mayak et al., *Acta Chim. Acad. Sci. Hung.* **111(2)** (1982) 233-8.

6. J.H. Kennedy, *Anal. Chem.* 33 (1961) 943.

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