Thermo. Titr. Application Note No. H-007

Title:	**Standardization of sodium tetraphenylborate solution**

***Scope*:**	Standardisation of sodium tetraphenylborate (NaTPB) solution for the determination of potassium and for non-ionic surfactants

***Principle*:**	The thermometric titration of NaTPB with K^+ results in the formation of insoluble KTPB and yields a single, sharp endpoint. Potassium hydrogen phthalate (KHPhth) is available in high purity, has a high formula weight and is a recognised primary standard for basic titrants such as NaOH

Reagents:	**Sodium tetraphenylborate (NaTPB, $(C_6H_5)_4BNa$) 0.3 mol/L Solution.** Weigh 51.3345 g NaTPB into a 500mL volumetric flask, add 1mL 1 mol/L NaOH solution, dissolve and make to volume with DI water. Mix well, and transfer to a brown glass storage bottle (NaTPB is light sensitive). Standardise against A.R. potassium hydrogen phthalate. Potassium hydrogen phthalate, A.R. (KHPhth)

Method:	Basic Experimental Parameters: Data rate (per second) 10 Titrant delivery rate (mL/min.) 1 No. of endothermic endpoints 1 Data smoothing factor 40 Procedure: Weigh accurately amounts of KHPhth varying between approximately 0.15 – 0.3g directly into titration vessels. Prepare at least 4 titration vessels containing a spread of masses of KHPhth. Add to each vessel approx. 25mL D.I. water, and dissolve before titrating with NaTPB to a single exothermic endpoint. Plot mmole KHPhth (x-axis) against mL NaTPB (y-axis) and calculate the gradient and y-intercept by regression analysis. The strength of the titrant is given by the reciprocal of the gradient.

Results:

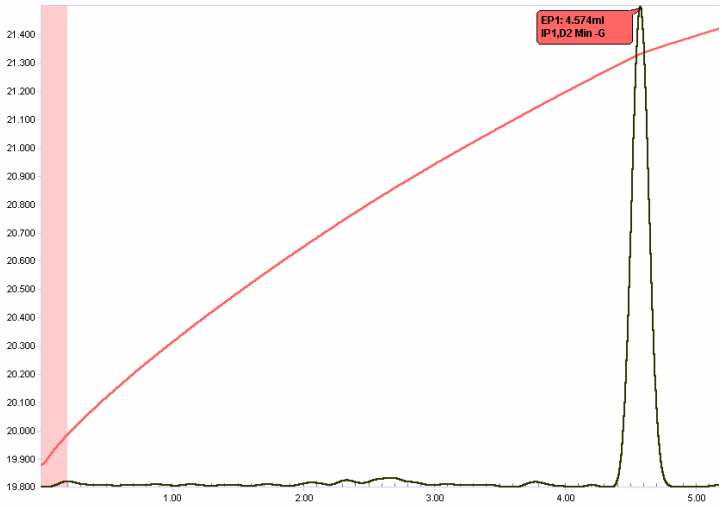
Standardization of NaTB :

KHPhth g	KHPhth mmole	NaTPB titre, mL
0.3014	1.4758	4.574
0.2166	1.0606	3.305
0.1700	0.8324	2.591
0.2538	1.2427	3.859

Calculation example:

$$Molarity = \frac{1}{gradient} = \frac{1}{3.07946} = 0.3247\ mole/L$$

Thermometric Titration Plot:



Legend:

Red = solution temperature curve

Black = second derivative curve

Calibration curve: