

Titer determination of KOH in Alcohol

Description

This application report describes the general procedure for the titer determination of KOH in alcohol for non-aqueous titrations. The procedure is also applicable to other alkaline titrants such as Tetrabutylammonium hydroxide.

The titer is a dimensionless number about 1 for correcting the indicated concentration. In the software of the titration devices and application reports from SI Analytics®, the term “Titer” describes the exact concentration in mol/l and not the dimensionless factor.

Instruments

Titration device	TL 7000, TL 7750, TL 7800
Exchangeable Unit	WA 10, WA 20, WA 50
Electrode	N 6480 eth (or other pH electrode)
Cable	L 1 A
Titration tip	Long version TZ 1643 required
Lab accessoires	Magnetic stirrer TM 235 or similar
	Glas beaker 150 ml

Reagents

1	KOH in alcohol
2	Potassiumhydrogenphthalate (KHPht) – certified reference material, volumetric standard
3	Soda lime
4	Destilled water
All reagents should be in analytical grade or better.	

Titration procedure

Reagents

KOH in alcohol

KOH in alcohol is available as a ready-to-use solution.

Caustic potash quickly absorbs CO₂ from the air and thus becomes unusable. The solution must therefore be protected from CO₂ with a CO₂ absorbent such as soda lime. For this purpose, a dry tube filled with soda lime is placed on the storage bottle.

Potassium hydrogen phthalate

The KHPht volumetric standard is dried as described in the corresponding certificate of analysis.

Cleaning and storage of the electrode

Use distilled water for cleaning the electrode. For storage use the same electrolyte solution as used in the electrode.

Sample preparation

The amount of volumetric standard depends on the size of the burette and the concentration of the KOH. The amount should be chosen so that about half of the burette volume is consumed. The most common is the 20 ml burette. The required quantity of KHPht can be estimated according to this rule of thumb:

$$W [g] = 2 * Concentration[mol/l]$$

For low concentrations (e.g. 0.01 mol/l), the required amount of reference material is very small and difficult to weigh. The following method is used: a larger quantity of KHPht (W_{KHPht}) is weighed into a flask. For this purpose, 100 - 200 times the amount of distilled water (W_{H2O}) is weighed and the KHPht is dissolved in it. An aliquot of A is weighed out of this solution for titration. The amount of KHPht contained in it is calculated according to the following formula:

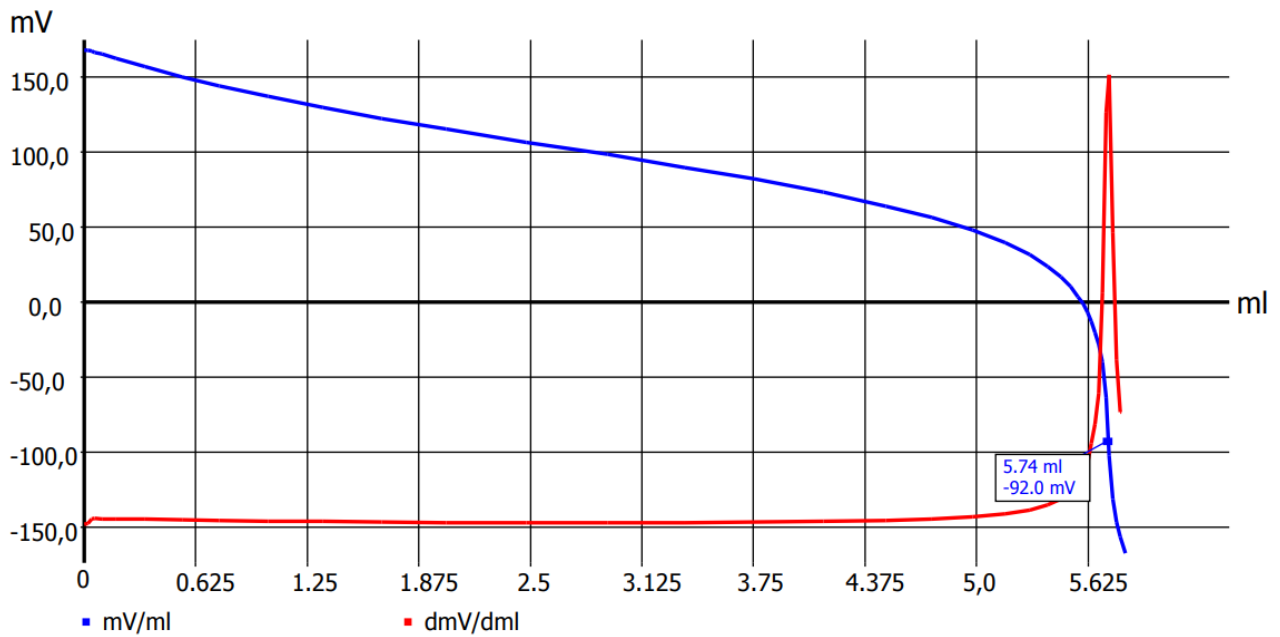
$$W [g] = \frac{W_{KHPht} [g]}{(W_{KHPht} [g] + W_{H2O} [g])} * A [g]$$

To determine the titer of a 0.1 mol/l KOH, about 0.2 g KHPht volumetric standard are weighed into a 150 ml beaker and made up to 60-80 ml with distilled water. When the KHPht is completely dissolved, it is titrated with the KOH to an equivalence point.

If the specified assay of the volumetric standard is different from 100%, the weight for calculating the concentration must be corrected:

$$W = \frac{Weight * specified assay \%}{100}$$

Titration parameter



Default method	Titer KOH		
Method type	Automatic titration		
Modus	Dynamic		
Measured value	mV		
Measuring speed / drift	individuell	Minimum holding time	3 s
		Maximum holding time	15 s
		Measuring time	2 s
		Drift	10 mV/min
Initial waiting time	0 s		
Dynamic	steep	Max step size	1.0 ml
		Slope max ml	15
		Min. step size	0.02 ml
		Slope min. ml	230
Damping	weak	Titration direction	decrease
Pretitration	off	Delay time	0 s
End value	off		
EQ	On(1)	Slope value	700
Max. titration volume	20 ml		
Dosing speed	100%	Filling speed	30 s

Calculation:

$$T \text{ [mol/l]} = \frac{W * F2}{(EQ - B) * M * F1}$$

B	0	Blank value
W	man	Weight of the sample [g]
F2	1000	Conversion factor ml - l
EQ1		Consumption of titrant until first Equivalence point
M	204,22	Molecular mass of KHPht
F1	1	Conversion factor

We recommend to write the exact concentration T to the Exchangable Unit (WA) automatically.