

Paint,
Adhesive

Acid Degree of Adhesive

Acid·base titration by
Automatic Potentiometric Titrator

Standard

1. Abstract

The acid degree of Adhesives is measured by titration with 0.01mol/L Sodium hydroxide after Acetone and water are added to the sample. The endpoint which is the maximum inflexion on titration curve is obtained by color change of the indicator.

The acid degree of sample is obtained by calculation from titration volume of Sodium hydroxide.

2. Reference

- 1) “Experiment and Calculation for Quantitative Analysis ” –Vol.2 by Seiji Takagi from Kyoritsu Publishing Company

3. Cautions in measurement

- 1) Handle with care when you work on chemicals.

4. Post-measurement care

Clean the photo sensor with solvent in the order of Acetone, Ethanol and Pure water.

5. Test equipment

Main unit: Automatic potentiometric titrator

(Option) Photometric preamplifier PTA-

Electrode : (Option) Photosensor
Interference filter (530nm)

6. Reagent

Titrant : 0.01mol/L Sodium hydroxide (f=1.00)

Additive : Acetone, Pure water

Indicator : Bromophenol blue

7. Measurement procedure

—Preparation—

1) Add 20mL ethanol to 0.1g of Bromophenol, and add water to make it 100mL in total as for indicator.

—Measurement—

1) Prepare 3g of sample in a 200mL beaker.

2) Add 90mL acetone and 3mL water.

3) Add 20 drops of Bromophenol indicator.

2) Titrate with 0.01mol/L Sodium hydroxide to obtain the acidity of adhesive.

8. Formula

Acid degree (mL/g) = EP1 / S

EP1 : Titration volume (mL)

S : Sample size (g)

9. Example of measurement

— Ambient condition —

Room temperature : 25 °C	Humidity : 83 %	Weather : Cloudy
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- Titration parameter -

Model : AT-400	
Method No. : 18	
Titr.mode : Intermit	
Titr.form : EP Stop	
[TITR. PARA]	[CALCU. PARA]
Form : EP Stop	Sample Measurement
Buret No. : 1	Conc1 CalcuNo. 2
Preamp : PTA	Conc1 Dim. []
Detector No. : 3	Conc1 EP Position 1
Dimension : %T	Data [f(EP2-EP1)]
Max.Vol : 20.0mL	T.Type [Normal]
W.Time : 0s	Data [f(T.Vol)]
Direction : Auto	Local Blank
	Blank 0.00mL
	Common T.Factor
[CTRL. PARA]	K1 1
End Point No. : 1	C1 1mg/mL
S(dE) : 40	Temp.Comp. [Off]
S(E/mL) : 100	
O.Titr : 0mL	
Gain : 1	
Cut off : 30s	
U.Vol : 0.01mL	
P.Speed : 100s/mL	
S.Pot : 4.0mV	
M.Unit : 0.01mL	
Separation : Off	
A.Simulation : Off	

-Titration curve-

Method	18
	[Intermit]
No.	03 - 01
Date	97/05/12 16:19
I.Lev	109.3%T
F.Vol	0.3000ml
F.Lev	81.0%T
Time	00:16:44
Size	3.0752g
Conc-1	.06270
EP-1	0.1928ml
	92.5%T

(The above printout data were obtained from titration by AT-400)

«TITR. PARA: Titration parameter»

Form: of titration / Buret No.: the burette used in titration / Detector No.: the detector used in titration
Dimension: potential unit/ Max Volume: of titration /Wait Time: before titration starts /Direction.: of titration

«CTRL. PARA: Control parameter»

End Point No. number of EPs detected / S(dE): EP potential (difference) / S(E/mL): EP potential (differential)
Over Titr.Vol. over-titration volume /Gain: sensitivity of detection signal/ Cut off intermittent / U.Vol: single dose volume of cut-off/P.Speed: dose speed/ S.Pot.: data sampling potential /Separation: of potential /M.Unit.: data sampling titration volume /Separation: of potential/ A.Simulation: redetection of EP

«CALCU. PARA: Result parameter»

Calc.No.: of formula / Conc.1: formula 1 / Conc1 Dim: unit of concentration/Conc1EP Position: EP at conc. 1
K1: unit conversion coefficient/ Factor: of reagent /Blank : blank level /Data: titration form used in calculation
T.Type: titration type (normal or back) /Common T.Factor: factor of titrant registered
C1(mg/mL): conc. at EP1/Data: calculation of titration / Temp.Comp.: temperature compensation

—Measurement results—

n	Sample (g)	Titration (mL)	Acidity (mL/g)	Batch calculated acid degree	
				Mean	SD
1	<u>3.0752</u>	<u>0.1928</u>	<u>0.06270</u>	0.06298 mL/g	0.00356 mL/g
2	<u>3.0067</u>	<u>0.2005</u>	<u>0.06668</u>	5.65778 %	
3	<u>3.0705</u>	<u>0.1829</u>	<u>0.05957</u>		

*The above results were obtained from 3 tests of the same sample.

* Red underline shows the data from page 3/4.

10. Summary

Adhesives are the most popular and convenient medium to adhere solid materials.

The sample measurement demonstrated as above shows a good repeatability with 5.7% relative standard deviation.

Precise and reliable measurement is assured by the automated potentiometry.

The analysis of acid degree of adhesives can be made perfectly by any of the following titration systems manufactured by Kyoto Electronics (KEM).

【AT-610】



Awarded Product of Supreme Technology from Kyoto City

- Easy key entry by touch panel of large color LCD (8-inch wide)
- Simultaneous titration in parallel
- Both potentiometric and Karl Fischer moisture titration (coulometric·volumetric) can be performed at a time.

【AT-510】



- Compact and cost performance model
- PC card expands data memory for convenience and versatility.

【AT-500N-1】



- Low cost and high performance
- Easy view with back light LCD
- GLP/GMP conformed model

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