

AQUACOUNTER Application Sheet	COM series	DATA No. K7	1st edition
Organic Acid		Fractionation quantification of acetic acid and ammonium acetate	

1. Measurement outline

The mixture solution of acetic acid and ammonium acetate is used as the washing solution in the semiconductor production process. There are several quantification methods to fractionate and quantify weak acid and weak acid salt. This section introduces the most typical method, which is the formaldehyde addition method. In this method, acetic acid is first titrated with sodium hydroxide (Formula 1). Then formaldehyde is added to form acid and hexamethylene tetramine in equivalent quantity as ammonium acetate (Formula 2). It is then continued to be titrated with sodium hydroxide to quantify ammonium acetate.



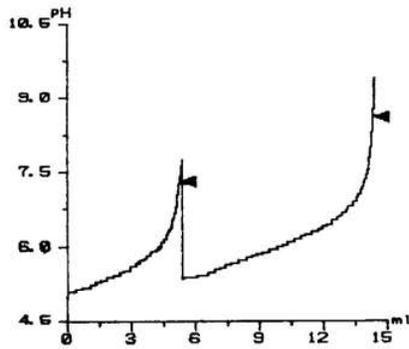
2. Reagents and Electrodes

(1) Reagents	Titrant	0.1mol/L sodium hydroxide titrant
	Loading buffer	Formaldehyde (35%) 5mL used for 1 measurement
(2) Electrodes *standard accessories	Indicator electrode	*Glass electrode GE-101B to IE jack
	Reference electrode	*Reference electrode RE-201 to RE jack

3. Measurement conditions example (for COM-1600S)

(1) Method	Auto
(2) End Sens	500
(3) Mode	2
Pre Int	0
Del K	5
Del Sens	0
Int Time	1
Int Sens	3
Brt Speed	2
Pulse	40

4. Measurement example



Measurement results on acetic acid

Sample No.	Sample volume (mL)	Titration value (mL)	Concentration (%)
1	2	5.219	3.1403
2	2	5.224	3.1433
3	2	5.129	3.1420
Avg.			3.142 %
Std. Dev.			0.002 %
C.V.			0.05 %

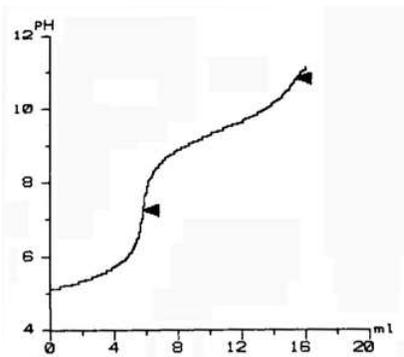
Measurement results on ammonium acetate

Sample No.	Sample volume (mL)	Titration value (mL)	Concentration (%)
1	2	9.064	7.0005
2	2	9.041	6.9827
3	2	9.049	6.9889
Avg.			6.991 %
Std. Dev.			0.009 %
C.V.			0.13 %

5. Outline

Other successive titration methods

The formaldehyde-free method is another fractionation quantification method other than this method. In this method, the sample is titrated with sodium hydroxide titrant, and the inflection point that indicates the titration end point for acetic acid is first obtained, and then the inflection point that indicates the titration end point for ammonium acetate is obtained. The feature of this method is that it does not require addition of formaldehyde. However, the titration end point for sodium acetate on the second step tends to be unclear depending on the concentration of ammonium acetate. An example of titration curve is shown below:



Measurement conditions

Method Auto
 End Sens 500, 100
 Mode

Key words

Fractionation quantification of acetic acid and ammonium acetate, formaldehyde, neutralization titration

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