



Application Note AN-T-234

OMNIS奥秘一代和Titrandot位滴定混合酸和TMAH的直接比

Comparative titration with OMNIS Titrator and 888 Titrandot

Ever since its introduction, the OMNIS platform has been compared to other high-quality Metrohm devices and software. Understandably, OMNIS has had to demonstrate its superior performance over these established systems. One satisfied customer from Taiwan did exactly that and found that the results obtained with OMNIS are even more accurate than with the well-proven Titrandot system.

The OMNIS buret with a 100,000 step resolution is superior to the Titrandot, with a resolution of either 20,000 steps (Exchange unit) or 10,000

steps (Dosing unit). Furthermore, improved performance of the dTodes with faster signal transfer and reduced signal noise ensures better results than when using analog electrodes.

This Application Note highlights customer-provided results of determinations of nitric acid, phosphoric acid, and acetic acid in an aluminum etching bath, as well as the determination of tetramethylammonium hydroxide (TMAH). Comparisons were made by using an OMNIS Titrator and an 888 Titrandot with identical analysis parameters.

SAMPLES AND SAMPLE PREPARATION

This application is demonstrated on aluminum etching bath and tetramethylammonium hydroxide

(TMAH) samples. The sample preparation is subject to a confidentiality agreement with the customer.

EXPERIMENTAL

The determinations are carried out on an OMNIS Professional Titrator equipped with a dEcotrode Plus (**Figure 1**) and an 888 Titrande equipped with an Ecotrode Plus. All selected parameters were identical.

The precise determination, the exact parameters, the chemicals used, and the titrant are subject to customer confidentiality.



Figure 1. OMNIS Professional Titrator equipped with a dEcotrode Plus.

RESULTS

A summary of results for the comparison of OMNIS and Titrande for aluminum etching bath samples is

shown in **Table 1**. The full results for each set of determinations are displayed in **Tables 2–4**.

Table 1. Overview of the results of nitric, phosphoric, and acetic acid determination in aluminum etching bath samples with an OMNIS Titrator and an 888 Titrande.

Device	HNO ₃ (%)	H ₃ PO ₄ (%)	HAc (%)
OMNIS SD(rel)	4.89	70.16	9.78
	0.37	0.06	0.70
Titrande SD(rel)	4.97	70.07	9.73
	0.28	0.14	1.56

Table 2. Results of nitric, phosphoric, and acetic acid determination in aluminum etching bath samples on different days with an 888 Titrand.

Day	HNO ₃ (%)	H ₃ PO ₄ (%)	HAc (%)
1	4.96	69.99	9.86
	4.97	69.94	9.99
2	4.96	70.15	9.69
	4.96	70.14	9.67
3	4.97	70.14	9.66
	4.98	70.21	9.52
4	4.97	70.10	9.64
	4.95	69.99	9.80
5	5.00	70.13	9.59
	4.97	69.92	9.92
Mean	4.97	70.07	9.73
SD(abs)	0.01	0.10	0.15
SD(rel)	0.28	0.14	1.56

Table 3. Results of nitric, phosphoric, and acetic acid determination in aluminum etching bath samples on different days with an OMNIS Titrator.

Day	HNO ₃ (%)	H ₃ PO ₄ (%)	HAc (%)
1	4.87	70.13	9.87
	4.87	70.12	9.84
2	4.88	70.16	9.73
	4.87	70.17	9.77
3	4.89	70.26	9.70
	4.91	70.14	9.78
4	4.90	70.16	9.69
	4.90	70.14	9.78
5	4.92	70.13	9.72
	4.90	70.18	9.88
Mean	4.89	70.16	9.78
SD(abs)	0.02	0.04	0.07
SD(rel)	0.37	0.06	0.70

Table 4. Results of tetramethylammonium hydroxide (TMAH) determination in β (TMAH) = 2.380% samples on different days with an 888 Titrand and an OMNIS Titrator.

	888 Titrand	OMNIS Titrator
Day	Result (%)	Result (%)
1	2.3820	2.3788
	2.3814	2.3794
	2.3813	2.3786
2	2.3818	2.3785
	2.3810	2.3780
	2.3816	2.3781
3	2.3792	2.3776
	2.3799	2.3779
	2.3803	2.3780
Mean	2.3809	2.3783
SD(abs)	0.0009	0.0006
SD(rel)	0.040	0.023

CONCLUSION

In addition to manufacturing high-quality analytical instruments, customer satisfaction is extremely important to Metrohm. The data collected and shared in this Application Note from a satisfied customer in Taiwan clearly shows the outstanding

performance of Metrohm titrators.

Aside from improving the precision and speed of the determinations, OMNIS delivers results on par or even better than with other established titration systems.

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CONFIGURATION



OMNIS Professional Titrator

新型、模式位分析 OMNIS Titrator,于独立行或作 OMNIS 滴定系的核心元件行,用于点和等当点滴定(一/)。由于采用 3S OMNIS Liquid Adapter 技,理化学产品从未像在一安全。可以使用量模和量管元自由配置滴定,并在需要展一台棒式拌器。包括用于使用其他滴定或加液模平行滴定的“Professional”功能可。

- 通算机或本地网控制
- 可以其他用或助溶液外接最多四个滴定模或加液模
- 棒式拌器的接方式
- 可提供不同大小的量管:5、10、20 或 50 mL
- 采用 3S 技的 OMNIS Liquid Adapter:安全理化学产品,自生厂家的原始数据

量模式和件:

- 点定滴定:“Basic” 功能可
- 点和等当点滴定(一/):“Advanced” 功能可
- 点和等当点滴定(一/),包括 5 路平行滴定:“Professional” 功能可