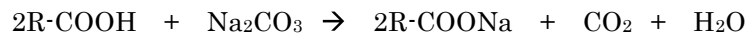


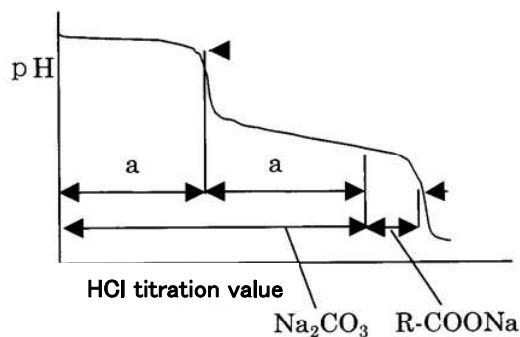
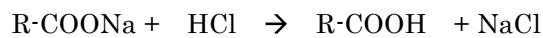
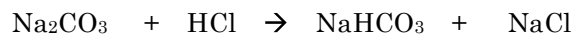
| | | | |
|-------------------------------|--|-------------|-------------|
| AQUACOUNTER Application Sheet | COM series | DATA No. F6 | 1st edition |
| Electronics | Quantification of Na_2CO_3 and resist blending quantity in photosensitive dry film developer | | |

1. Measurement outline

In printed wiring board manufacture process, the photosensitive dry film after cohering to the printed wiring board and exposure to light is developed by soaking the dry film resist which has not been exposed to light in Na_2CO_3 solution to dissolve as carbonate salt.



While the concentration of Na_2CO_3 in the developer decreases when development is repeated, the resist concentration increases. The rate of development failure can be reduced by controlling the Na_2CO_3 concentration and the quantity of resist blending. This section introduces an example in which the Na_2CO_3 concentration in developer was measured by neutralization titration and the resist blending quantity was measured by neutralization titration simultaneously by fractionation titration.



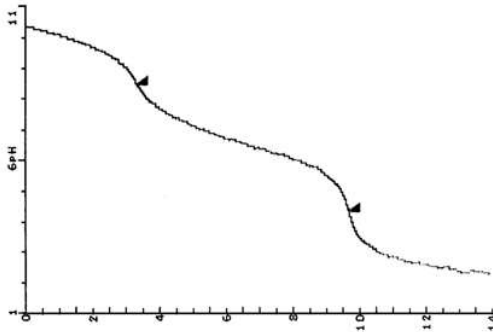
2. Reagents and Electrodes

| | | |
|-----------------------|---------------------|--|
| (1) Reagents | Titrant | 0.1mol/L HCl titrant |
| (2) Electrodes | Indicator electrode | *Glass electrode GE-101B to IE jack |
| | Reference electrode | *Reference electrode RE-201 to RE jack |
| *standard accessories | | |

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

| Master File No.1 | | | | | |
|--|---------------------------------------|--|-----------------------------------|------------|-------|
| Condition file: 1 + 2 | | | | | |
| Parameters for Condition file 1 (For 1 st End point) | | Parameters for Condition file 2 (For 2 nd End point) | | Mode No.2 | |
| Method | AUTO | Method | AUTO | Pre Int | 0 sec |
| Amp No. | 1 | Amp No. | 1 | Del K | 5 |
| Buret No. | 1 | Buret No. | 1 | Del Sens | 0 mV |
| Meas Unit | pH | Meas Unit | pH | Int Time | 1 sec |
| S-Timer | 10 sec | S-Timer | 0 sec | Int Sens | 3 mV |
| CP | 0 mL | CP | 0 mL | Brst Speed | 2 |
| DP | 0 mL | DP | 0 mL | Pulse | 40 |
| End Sens | 1000 | End Sens | 1000 | | |
| Over mL | 0 mL | Over mL | 0 mL | | |
| Max. Vol. | 20 mL | Max. Vol. | 20 mL | | |
| Mode No. | 2 | Mode No. | 2 | | |
| Unit | % | Unit | % | | |
| Formula | $(D-VB) \times K \times F \times M/S$ | Formula | $VB \times K \times F \times M/S$ | | |
| Blank | 0 | Blank | 0 | | |
| Molarity | 0.1 | Molarity | 0.1 | | |
| Factor | Titer of the titrant | Factor | Titer of the titrant | | |
| K | 40 | K | 106 | | |

4. Measurement example



Measurement results on Na_2CO_3 and resist blending quantity

| Sample No. | Sample volume (mL) | Na_2CO_3 | | Resist blending quantity | |
|------------|--------------------|--------------------------|-------------------|--------------------------|-------------------|
| | | Titration value (mL) | Concentration (%) | Titration value (mL) | Concentration (%) |
| 1 | 5.0 | 8.28 | 0.887 | 1.42 | 0.0287 |
| 2 | 5.0 | 8.26 | 0.885 | 1.44 | 0.0291 |
| Avg. | | 0.886 % | | 0.0289 % | |
| Std. Dev. | | 0.0014 % | | 0.00028 % | |
| C.V. | | 0.16 % | | 0.17 % | |

5. Outline

About online-type automatic analyzers

An online-type analyzer (dry film developer analyzer DFT-1) has been commercialized for this analysis. It is optimal for automatic analysis of Na_2CO_3 developer in printed wiring board manufacture process. In addition, this system is equipped with concentration control function for developer solution and has a wide range of application. It is thus optimal for process control.

Key words

Dry film, neutralization titration, sodium carbonate, resist blending quantity

Hitachi High-Technologies Corporation

Head Office 1-24-14, Nishishinbashi, Minato-Ku, Tokyo 105-8717, Japan

Tel : 81-3-3504-7239 Fax : 81-3-3835-7302

<http://www.hitachi-hitech.com>

Hiranuma Sangyo Co., Ltd.

1739, Motoyoshidacho, Mito-City, Ibaraki 310-0836, Japan

Tel : 81-29-247-6411 Fax : 81-29-247-6942

<http://www.hiranuma.com>