

## TOC Measuring of Electroplating Solution With TOC-5000A

Organic additives are added to plating solution used in the plating process for printed circuit boards. And the additive concentration effects the drawing qualities and thermal shock of the plate. If these effects are bad, nonconformities occur like pattern peeling when the print board is bent, and cracks form in the pattern during soldering. The additive concentration changes due to mixing it into the copper plating during the plating process, adhering to the plated product, and extraction by the activated carbon process during the plating process.

With Shimadzu's total organic carbon analyzer TOC-5000A, controlling the additive concentration in the plating solution improves production yields and quality.

### Purpose

To control additive concentration in plating solutions.

Analyte: TC, IC, TOC (TC-IC)

Measuring Method: Dilute samples I and II at 1 to 100, and measure.

### Comparison with Conventional Method

Conventional measurement is to use an electrochemical method, but if TOC is used, the organic carbon concentration can be measured directly and promptly. Also, on-line measuring is possible with Shimadzu's on-line TOC analyzer.

### Measuring Conditions

Sample (1):

Plating solution [2777 mgc/L] (measured by TOC-5000A)

Sample (2):

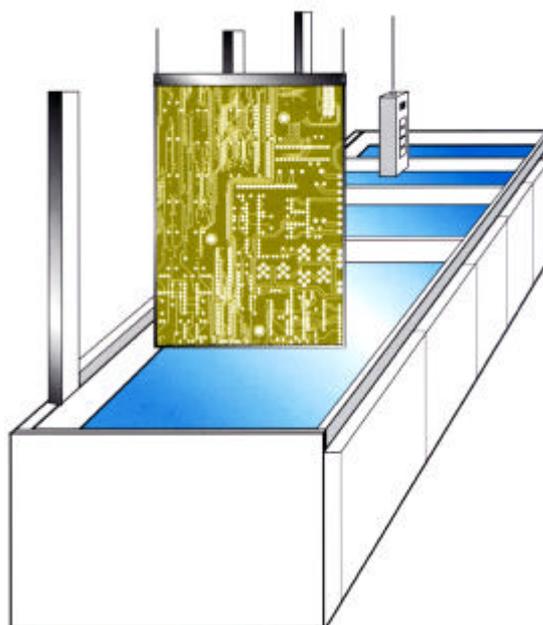
Organic additive [31710 mgc/L] (measured by TOC-5000A)

The organic additive (2) is added to the plating solution (1) as shown in the following ratios of "Sample I" and "Sample II", and observations were made to confirm whether or not the organic matter concentration can be measured without effect from the sulfuric acid and copper sulfate which are coexisting components of the plating solution.

Sample I: Sample (1) 10 mL + sample (2) 1 mL

Sample II: Sample (1) + sample (2) 3 mL

Analyzer: TOC-5000A



## Results

Samples	TOC Theoretical Value(mgC/L)	TC (mgC/L)	IC (mgC/L)	TOC(TC-IC) (mgC/L)	Recovery Rate (%)
I: plating solution 10mL + organic additive 1mL	5407	5150	0	5150	95.2
II: plating solution 10mL + organic additive 3mL	9454	9010	0	9010	95.3

Table 1: Measured results

As the recovery Rate was nearly 100% for both sample I and sample II, organic matter concentration can be measured without effects from the sulfuric which are coexisting components in the plating solution.

## Benefits

Controlling the additive concentration in the electroplating solution with TOC-5000A improves production yields and quality

1. Operation is easy due to simple measuring principle and setup.
2. Fast measurement allows a multitude of sample measurement.
3. Maintenance is easy.
4. On-line measuring also is possible.

UP to now plating control has been difficult, time consuming and costly, but now control is easy with the TOC analyzer.

## Application in Other Fields

Here are some TOC-SOOOA application examples.

1. Control of etching solutions
2. Control of component rinse water after plating
3. Measuring organic components on glass fiber surfaces used in printed circuit boards
4. Extraction management of lubricants used in the production and processing process of electronic components

Shimadzu would be glad to give further advice on the suitable application of this device.

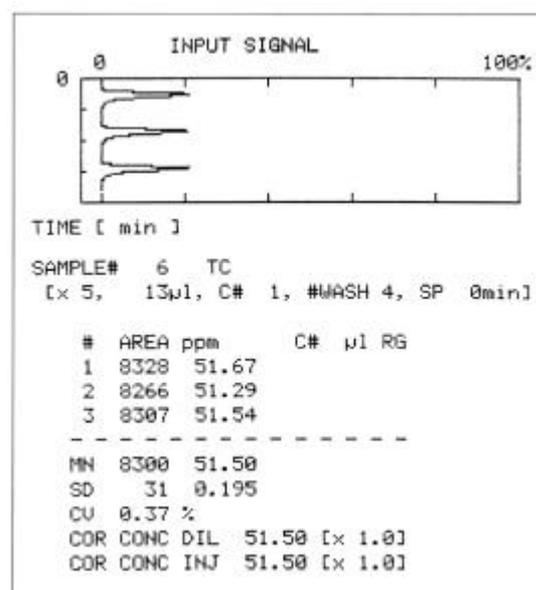


Fig.1: plating solution 10mL + additive 1mL

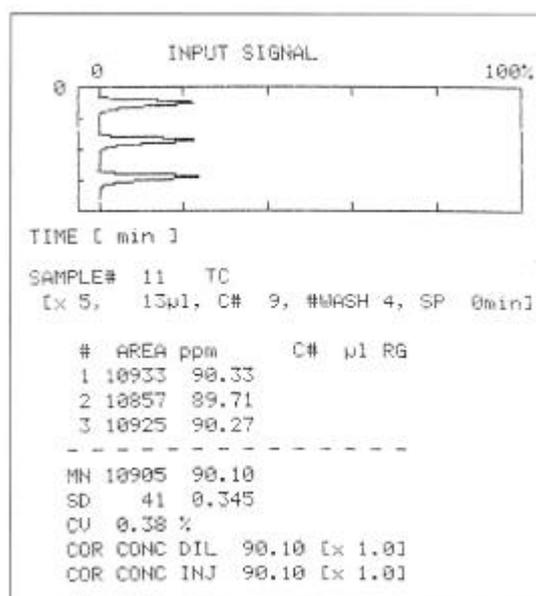


Fig.2: plating solution 10mL + additive 3mL