

# Quality control and optimization of coating processes using ion chromatography (IC)

## Ultratrace analysis of impurities in basic chemicals and raw materials

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Surface finishing such as electroplating is one of the most important industrial processes to design products with dedicated physical, chemical, and electronic properties. Purity and composition of solutes, solvents, catalysts, and the electrolytic baths are a key requirement to achieve the desired properties, prevent damages and inferiority of the products by imbalances or contaminations. Impurities, even on an ultratrace level, can have detrimental effects for example on the electrical properties of integrated circuits and final products in the semiconductor industry. Therefore, Semiconductor Equipment and Materials International (SEMI) stipulates for many basic chemicals and raw materials impurity levels in the low  $\mu\text{g/L}$  range. Ion chromatography (IC) is the ideal method for analyzing ionic impurities, even in the  $\text{ng/L}$  range.

Impurities like fluoride, chloride, bromide, nitrite, nitrate, phosphate, or sulfate may alter the properties of a bath. Consequently, the plating properties are impaired or the semiconductor even damaged. Chemicals and raw materials used for process solutions, such as etching, plating, or cleaning solutions, need to be virtually free of such ionic impurities. IC, combined with [Inline Matrix Elimination](#) and [Inline Preconcentration](#), is ideal to determine such impurities even in ultratraces.



Inline Matrix Elimination removes uncharged or oppositely charged matrix components (e.g., hydrogen peroxide), thus reducing sample preparation and improving the column lifetime. Additional combination with the intelligent Inline Preconcentration increases the measuring sensitivity, allowing the analysis of impurities in the  $\text{ng/L}$  range.

Example applications include:

- Trace anion and cation analysis in ultrapure water
- Trace anion analysis in acids
- Chloride and sulfate in tetramethylammonium hydroxide (TMAH)
- Anionic impurities in hydrogen peroxide or organic solvents such as isopropanol

The robustness of the technique allows to handle almost all process solutions, such as etching, extracting, or rinsing solutions.

## Downloads

AN-S-304 Variable Inline Preconcentration including Matrix Elimination for trace anion analysis (MiPCT-ME)

AN-S-067 Traces of chloride and sulfate in a developing bath

AN-S-250 Trace anions in tetramethylammonium hydroxide (TMAOH)

AN-CS-012 Determination of trimethylamine and standard cations in 30% hydrogen peroxide ( $\text{H}_2\text{O}_2$ )

AN-S-352 Determination of pyrophosphate and standard anions in 30% hydrogen peroxide ( $\text{H}_2\text{O}_2$ )

## PRESS RELEASE FOR IMMEDIATE PUBLICATION

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**Image:**

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### About Metrohm

Metrohm is one of the world's most trusted manufacturers of high-precision instruments for laboratory and process analysis. The company was founded in 1943 by engineer Bertold Suhner in Herisau, Switzerland, where it is headquartered to this day. Metrohm offers a comprehensive portfolio of analytical technologies ranging from titration and ion chromatography to near-infrared and Raman spectroscopy, as well as several other techniques. Metrohm sells its products and provides services through its own local subsidiaries and exclusive distributors in more than 120 countries worldwide. Our mission in a nutshell is helping customers from virtually every industry analyze and maintain the quality of their products at every stage in the manufacturing process and beyond. Since 1982, Metrohm has been owned 100% by the non-profit Metrohm Foundation. This foundation keeps to its purpose to support charitable, philanthropic, and cultural projects in eastern Switzerland and, above all, ensure the independence of the company.

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