

Determination of ultratrace elements in semiconductor grade Isopropyl Alcohol using the Thermo Scientific iCAP TQs ICP-MS

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To read the full app note, click here: <https://assets.thermofisher.com/TFS-Assets/CMD/Application-Notes/an-44356-tq-icp-ms-ultratrace-elements-isopropyl-alcohol-an44356-en.pdf>

Introduction

Isopropyl alcohol (IPA) is used to clean wafers during production in the semiconductor industry. As IPA comes into direct contact with wafer surfaces, it must be controlled for its trace metal purity. Because of its high elemental sensitivity, ICP-MS is widely used in quality control analyses of materials in the semiconductor industry. An ICP-MS technique for the direct analysis of IPA would provide a useful control for ultratrace (ng·L⁻¹) levels of analytes in IPA and avoid any contamination caused by sample preparation.

IPA has historically been considered a difficult matrix to analyze directly by ICP-MS due to its high volatility, low viscosity and high carbon content.

In this application note, cold plasma and triple quadrupole ICP-MS technologies are combined within a single analytical method to remove sample matrix and argon based interferences. With the use of cold plasma, the ICP ion source is run at a significantly lower power, effectively suppressing the ionization of argon and carbon and therefore eliminating polyatomic species that would otherwise interfere with target analyte ions. For some analytes that are more sensitive in hot plasma, a triple quadrupole mass shift analysis mode was employed for accurate, interference free analysis.

All samples were presented for analysis using a Teledyne CETAC Autosampler ASX-112FR System (Omaha, NE, USA).