

Atomic Spectroscopy Learning Hub Tutorial

ICP-MS Application Specific Set Up

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Agenda

Demonstration for the set up of ICP-MS for the analysis of:

1. Routine analysis with aqueous samples
2. High Total Dissolved Solid (TDS) containing samples, i.e. high matrix
3. Organic solvent analysis
4. Samples with Hydrofluoric (HF) acid matrix in solution

Standard Set Up for Routine Analysis of Aqueous Samples

Glass concentric nebulizer for high sensitivity and robustness



Quartz Scott double pass Spray chamber for aerosol filtering and good precision



**PVC (e.g. Tygon®) Peristaltic Pump tubing for sample and internal standard (ISTD) uptake
Long life 3-stopper Drain tubing**



Nickel tipped sampler cone with Copper base for chemical resistance and thermal heat transfer at economical cost



Nickel skimmer cone for chemical resistance at economical cost



Quartz Single-Piece torch with 2.5mm injector diameter



High Matrix Set Up for high Total Dissolved Solids (TDS) Samples



Parallel path nebulizer (MiraMist) for avoiding blockages due to particulates and high sensitivity

Spray chamber with gas port for Argon gas dilution of sample aerosol (UHMI)



Argon humidifier to humidify nebulizer gas when analyzing high dissolved solids solutions, to reduce salt build-up in the sample introduction system



Nickel plated sampler cone for corrosion resistance of Copper base with high matrix



All Nickel or Platinum tipped with Nickel base skimmer cone for chemical resistance



PVC (Tygon®) Peristaltic Pump tubing with black/black tabs (0.76mm id) for both sample and internal standard (ISTD) uptake to provide 1:1 dilution on-line



Organic Set Up for Analysis of samples in Organic Solvent matrix

Spray chamber operated at -5°C instead of $+2^{\circ}\text{C}$ to reduce solvent loading on plasma

Oxygen (Option Gas – 80%Ar:20%O₂) added to Spray chamber gas port to prevent Carbon deposition on injector and cones



Solvent-resistance PVC (SolvaFlex®) Peristaltic Pump tubing for sample and internal standard (ISTD) uptake



Platinum tipped sampler and skimmer cones to prevent Nickel carbide formation which is vaporized in high temperature plasma – enlarging orifice and shortening cone life time



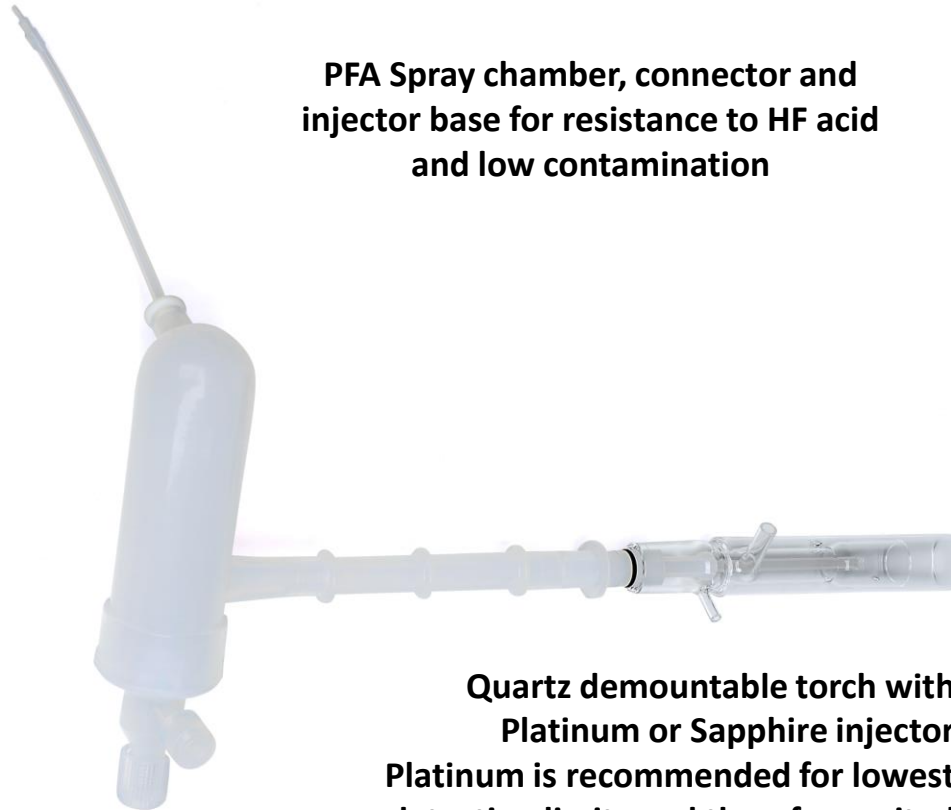
Quartz Single-Piece torch with 1.0 or 1.5mm injector diameter



Inert Set Up for Analysis of Hydrofluoric (HF) acid in solution

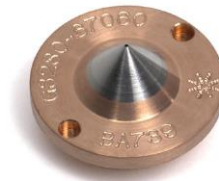
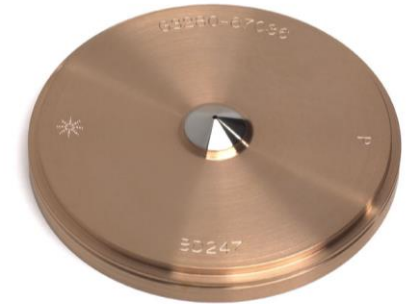


PFA concentric nebulizer for high sensitivity and self-aspiration (lowest %RSD's) or pumped operation



**Quartz demountable torch with Platinum or Sapphire injector
Platinum is recommended for lowest detection limits and therefore suited to semiconductor applications**

PFA Spray chamber, connector and injector base for resistance to HF acid and low contamination



Platinum tipped skimmer and sampler cones for chemical resistance and lowest background