

# GETTING THE MOST OUT OF YOUR ICP IN THE GEOCHEMICAL LAB



**VISIT BOOTH # 2727**  
[www.geicp.com](http://www.geicp.com)



# CHALLENGES IN THE GEOLOGY LAB

- Sample Prep
  - Homogeneity
  - Grinding
  - HF
  - MicroWave
- Analysis
  - HF
  - High TDS
  - Carryover



# SUITABLE NEBULIZERS

- OpalMist
  - HF
  - high TDS
  - high purity
- DuraMist
  - HF
  - high TDS
- Ceramic VeeSpray
  - HF
  - particulates
  - high TDS
- SeaSpray
  - high TDS



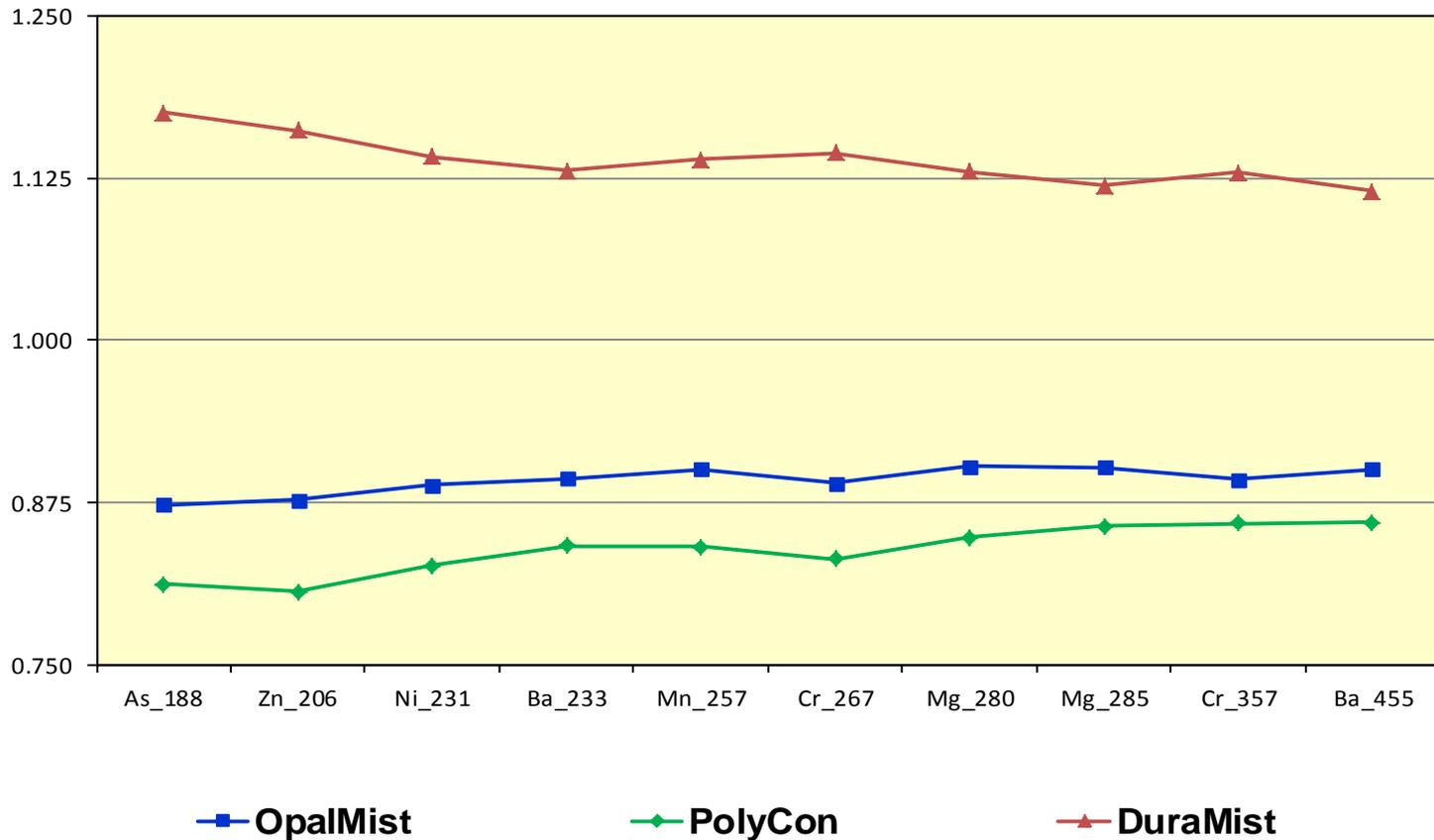
# DURAMIST NEBULIZER

## Ideal for HF and High TDS Samples

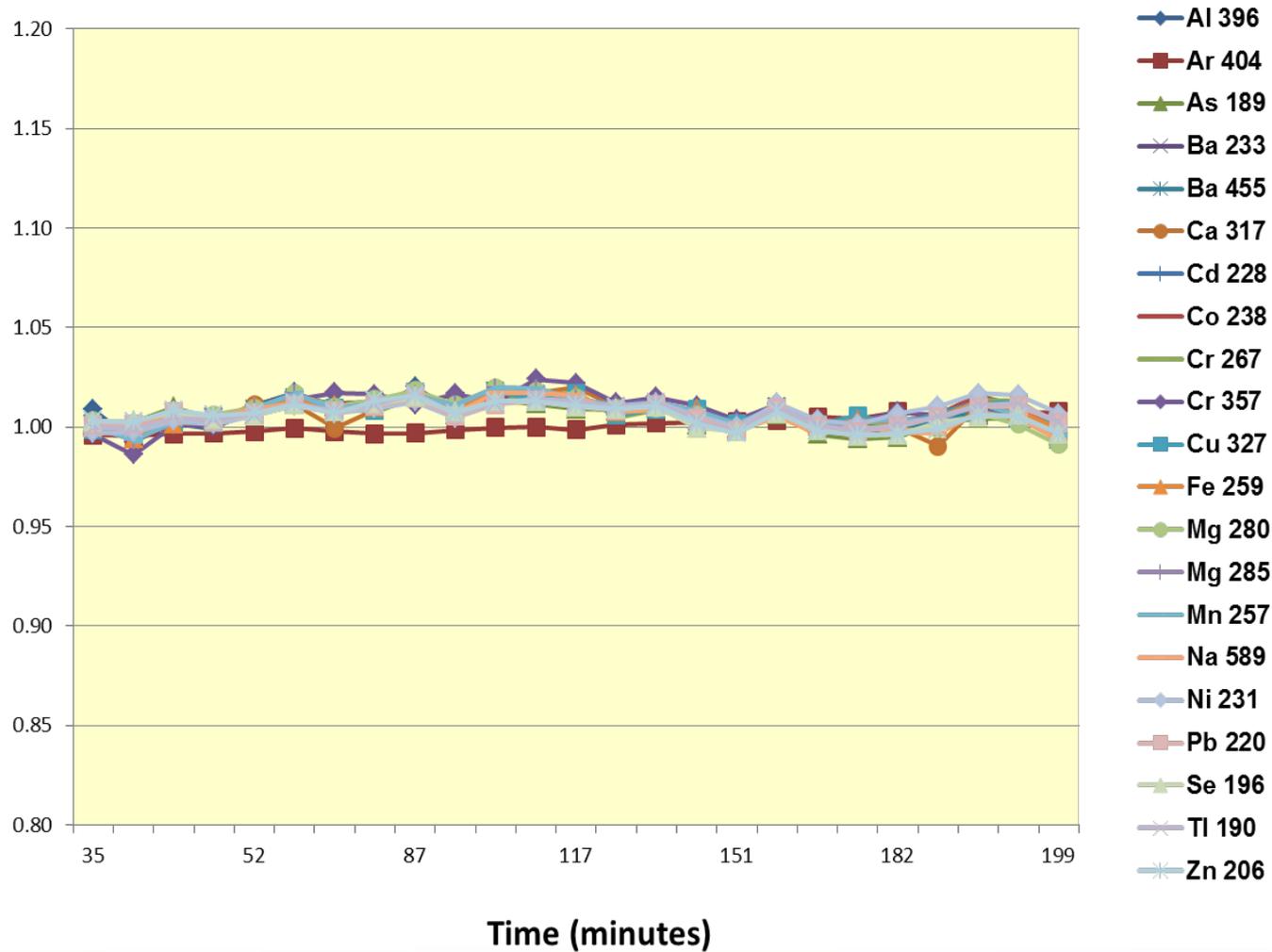
- PEEK body and PFA capillary.
- Particulates up to 75um.
- Tolerance to harsh chemicals, up to 5% HF.
- TDS tolerance, typically ~ 30%.
- 0.4 and 1.0 mL/min uptake models.
- Designed for 40psi, either 1.0 or 0.7 L/min argon flow.



# COMPARISON OF SENSITIVITY

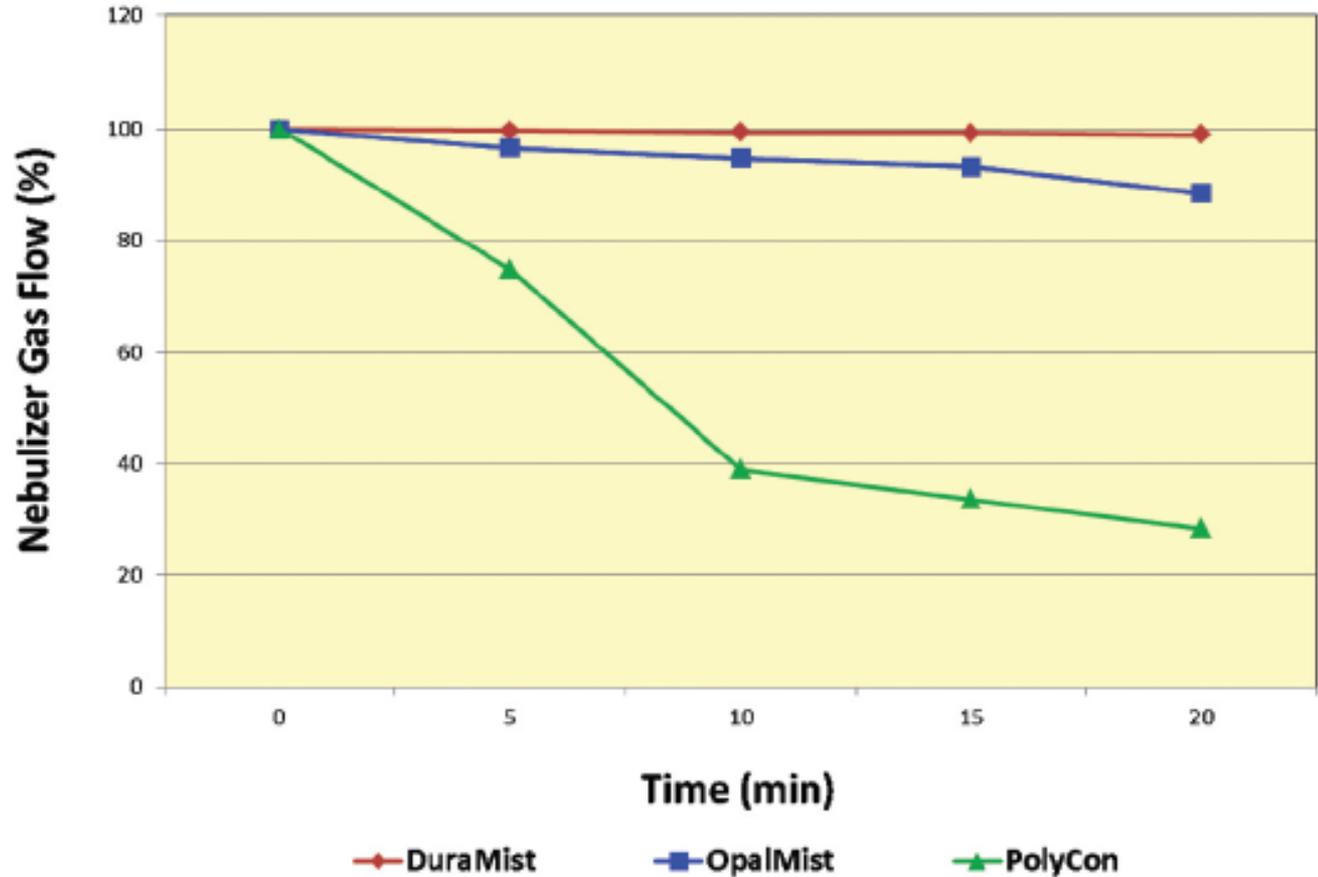


# DURAMIST LONG-TERM STABILITY



# Tolerance to Dissolved Salts (20%)

- Natural aspiration of 20 % NaCl.
- Nebulizer gas flow monitored at constant pressure.
- Total time of 20 minutes.



# INERT SPRAY CHAMBERS

- ICP-OES

- PTFE Material
  - Inert
  - High purity
  - Stediflow surface treatment
- 50mL internal volume

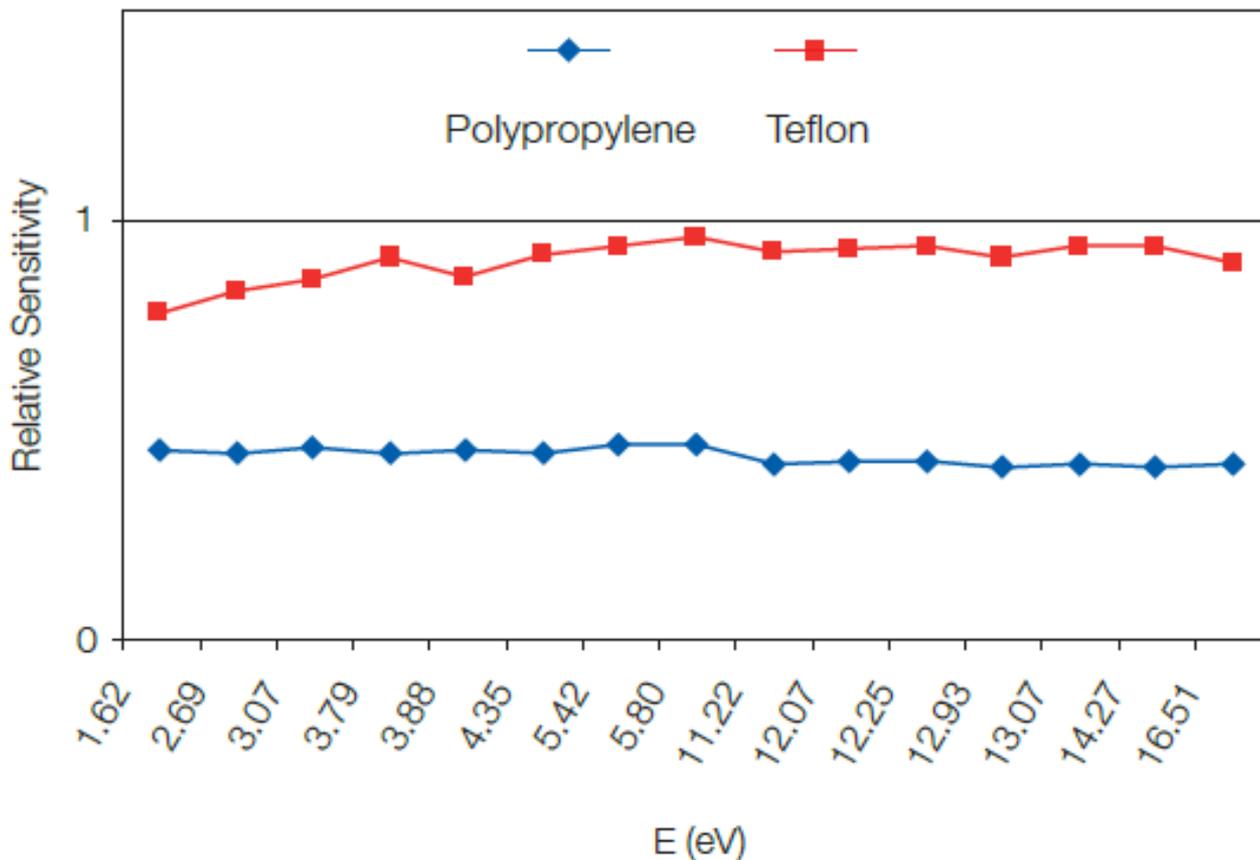
- ICP-MS

- PFA Material
  - Inert
  - Ultra high purity
  - Stediflow surface treatment
- 44mL internal volume



# INERT SPRAY CHAMBERS- SENSITIVITY

Sensitivity of inert spray chambers relative to glass spray chamber (relative sensitivity = 1)



# EFFECT OF CHALLENGING MATRICES ON TORCHES

## Challenging Matrices



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# THE D-TORCH – DEMOUNTABLE TORCH

- Demountable outer tube.
- Demountable injector.
- Optional ceramic outer tube.
- Economical price.



# TORCH COMPARISON: CASE 1

6 HOURS OF RUNNING 10% NaCl



Quartz outer tube



Ceramic outer tube

# TORCH COMPARISON: CASE 2

## Lithium Metaborate fusions



3 years at 5 - 7 days per week  
(20 - 22 hours per day)



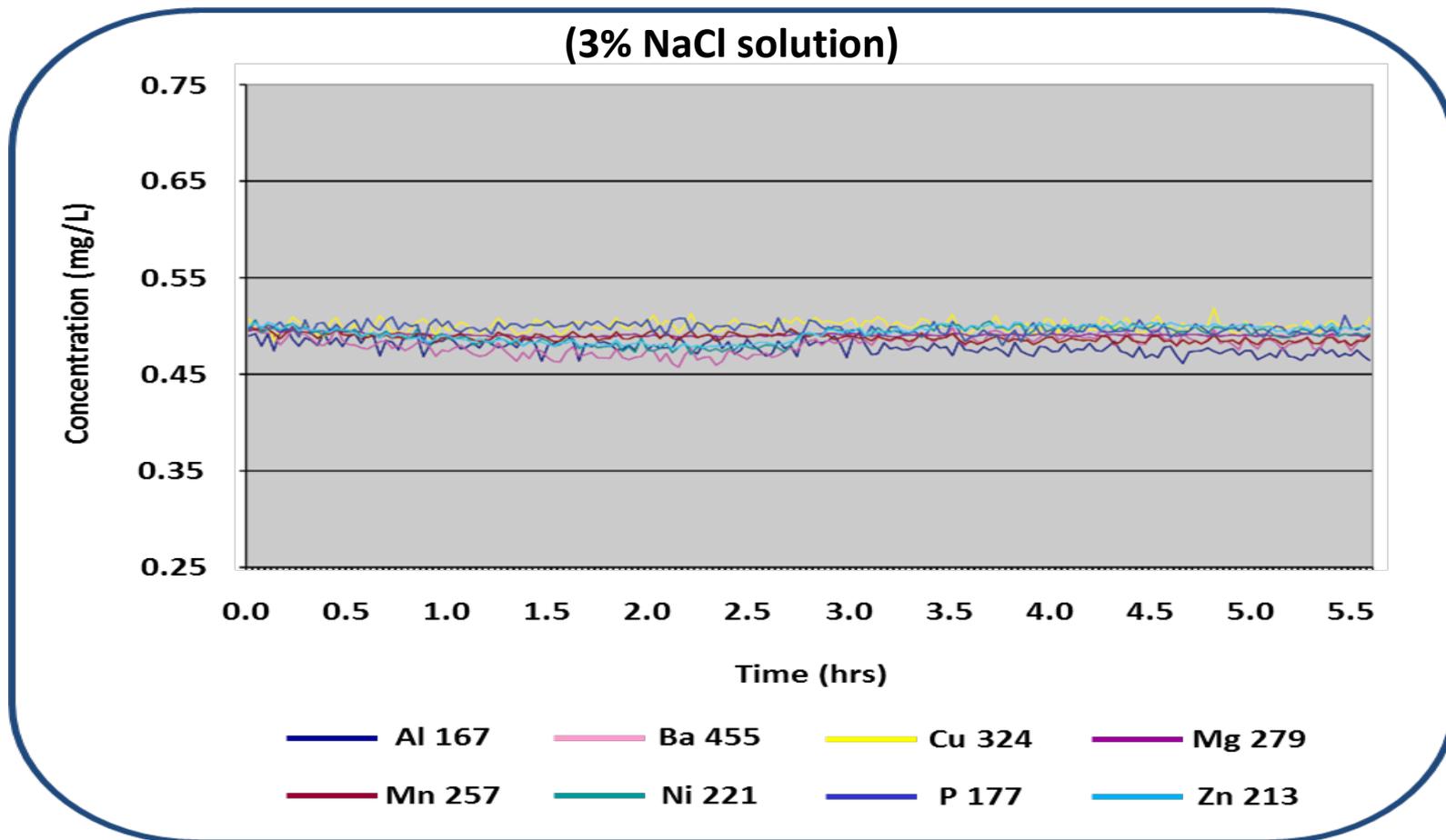
Brand new ceramic outer tube

- Standard quartz torch was lasting approximately 100 hours.
- Ceramic torch has replaced 200 standard quartz torch.
- Saving approximately \$40,000.00 USD in consumable costs.

# D-TORCH DL COMPARISON

Element ( $\lambda$ )	Detection Limit ( $\mu\text{g/L}$ )	
	Radial Quartz Torch	Radial Ceramic D-Torch
Al 167	1.6	1.1
Ba 455	0.07	0.12
Cu 324	0.88	0.62
K 766	25.5	11.7
Mg 279	0.05	0.05
Mn 257	0.36	0.25
Ni 221	1.6	1.3
P 177	5.1	5.0
Zn 213	0.23	0.28

# STABILITY USING CERAMIC D-TORCH



# MINIMIZING CARRYOVER

- Niagara CM
  - Reduces exposure to sample on back end
  - Starts rinsing earlier
- Niagara Plus CM
  - Reduces exposure to sample on back end
  - Reduces exposure to sample on front end
  - Starts rinsing earlier
  - Sample does not contact pump tubing



# SUMMARY

- DuraMist nebulizer
- Inert spray chamber with Stediflow
- D-Torch with ceramic outer tube
- Niagara accessory for fast washout