ANY ANALYTE, ANY METHOD, ONE PARTNER

ONLY AGILENT
COVERS ALL YOUR
MASS SPEC NEEDS

JetClean
Self-cleaning ion source

Elizabeth Almasi
Applications Manager

June 9, 2016

What are your plans for the weekend?

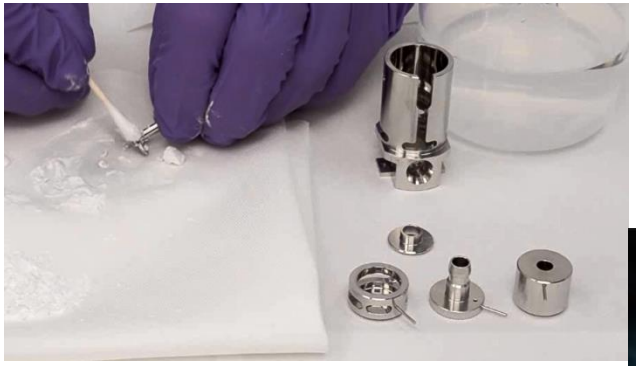
Cleaning is a universally detested activity

We are willing to pay to avoid the routine cleaning by using carwash, dry-cleaning, etc.

The same disdain applies in the laboratory

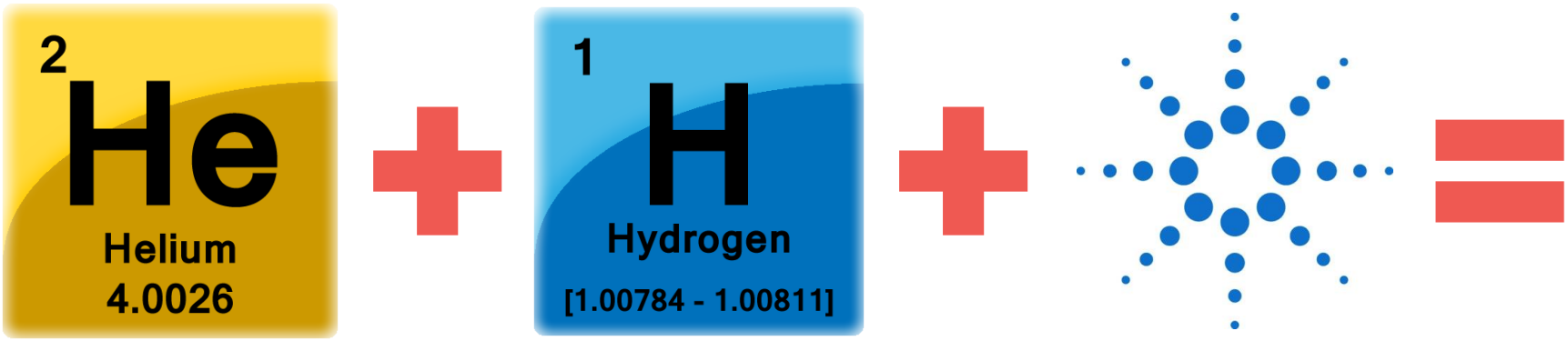
We do source cleaning:

- **Because there isn't a better alternative**
- **In every application, in every market**
- **Part of the unavoidable analytical routine**



But exciting now, there is an alternative:

GC/MS Quad Source that cleans itself

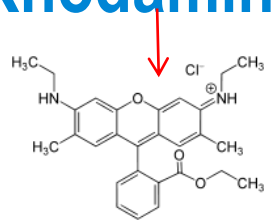


Patented ***JetClean***

Self-cleaning ion source

- Consistent response for months or even years
- Reduces or eliminates the downtime for manual source cleaning
- Available as an option or upgrade on single and triple quad GC/MS systems

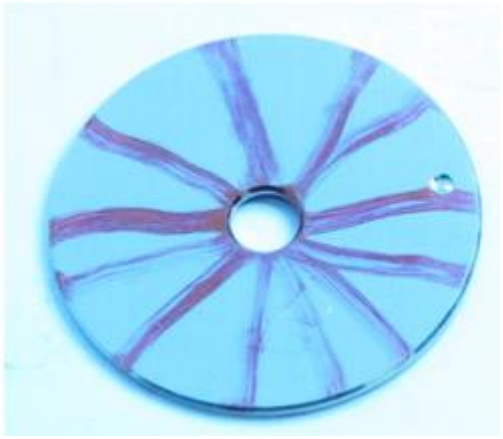
Rhodamine 6G Treated Lens: Before & After Cleaning



MW: 477

Artificial contamination

After JetClean



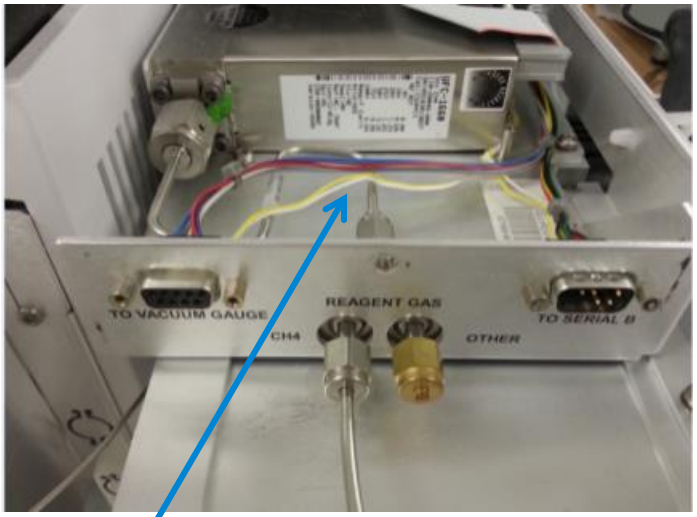
After He Bakeout

- The “heavy contamination” was removed where lens was exposed to H_2.
- The remaining dark “inked” areas are consistent with the masking by the ion volume “step”
- Same treatment using only He (bake out) did not clean the surface

Main features

Carefully controlled H_2 flow

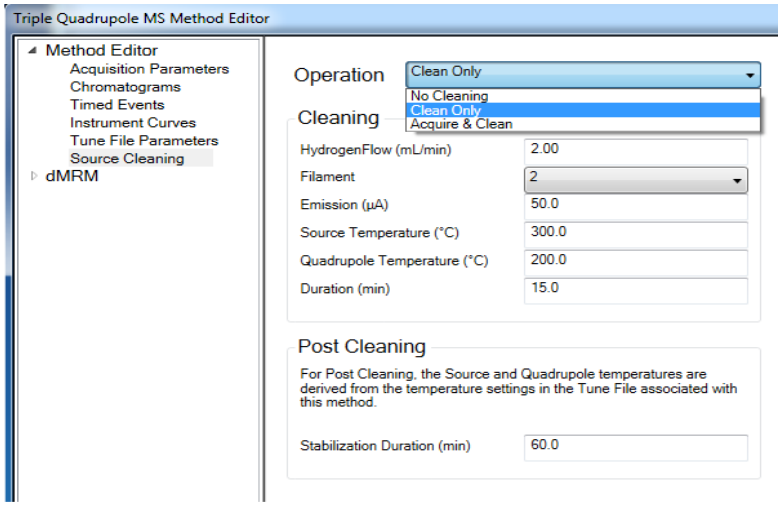
introduction to the MS at very low flow rates



Mass Flow Controller (MFC)

Simple, integrated software

Set-up as simple as a pressure pulsed injection. Now only in MassHunter.



Parameters saved in the method, included log file, readily transportable

Modes of Operation:

General Applications

"Clean only"
(Batch mode)

Analysis • Helium

Cleaning • Helium • Hydrogen

EI/CI mode

Validated Applications

"Acquire and Clean"
(Concurrent mode)

Analysis Helium Hydrogen

EI only mode

Potential interaction

No Interaction

The Proof...

Validated PAH Analysis - Acquire and Clean (US)

Journal of Chromatography A, 1419 (2015) 89–98

Contents lists available at ScienceDirect

Journal of Chromatography A

journal homepage: www.elsevier.com/locate/chroma

Modified ion source t
chromatograph for polycyclic aroma rocarbon analyses

Kim A. Anderson[a,*], Micha
Peter D. Hoffman[a]

[a] Department of Environmental and Molecular
[b] Agilent Technologies, Wilmington, DE 19808,

ARTICLE INFO

62 PAHs, “archetypally difficult”

Range 1-10,000pg/µl, R^2>0.998

5% of true values, over many month

Non-reactive, nonpolar compound classes are generating exceptional results in the Acquire & Clean operational mode

cation and qu subset, such as the 16 PAHs the US EPA has defined as priority pollutants. Without source and extractor lens modifications, the off-the-shelf GC–EI/MS/MS system was unsuitable for complex PAH analysis. Separations were enhanced by increased gas flow, a complex GC temperature profile incorporating multiple isothermal periods, specific ramp rates, and

Mean limits of LODs 1.02 +/- 0.82pg/ µl

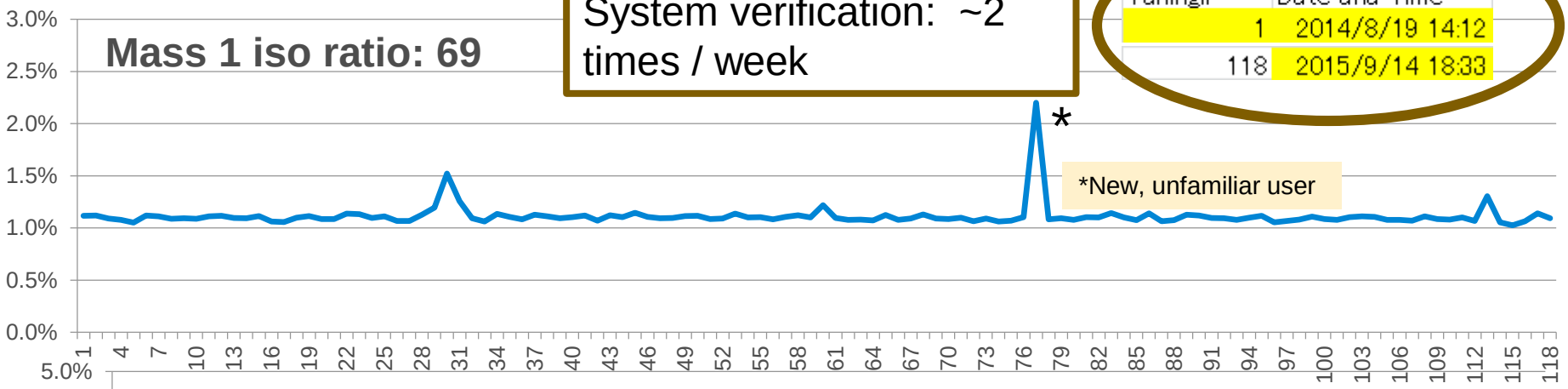
values over ve 7 values were typically >0.998, exceptional for compounds which are archety with this method benzo[a]fluorene, benzo[b]fluorene, benzo[c]fluorene were fully separated as benzo[b]fluoranthene Chrysene and triphenylene, were sufficiently sepa of detection (LODs) across all PAHs were 1.02 ± 0.8 lowest LOD at 0.26 pg µl^{-1} and only two analytes al dibenzo[a,e]pyrene (6.44 pg µl^{-1}).

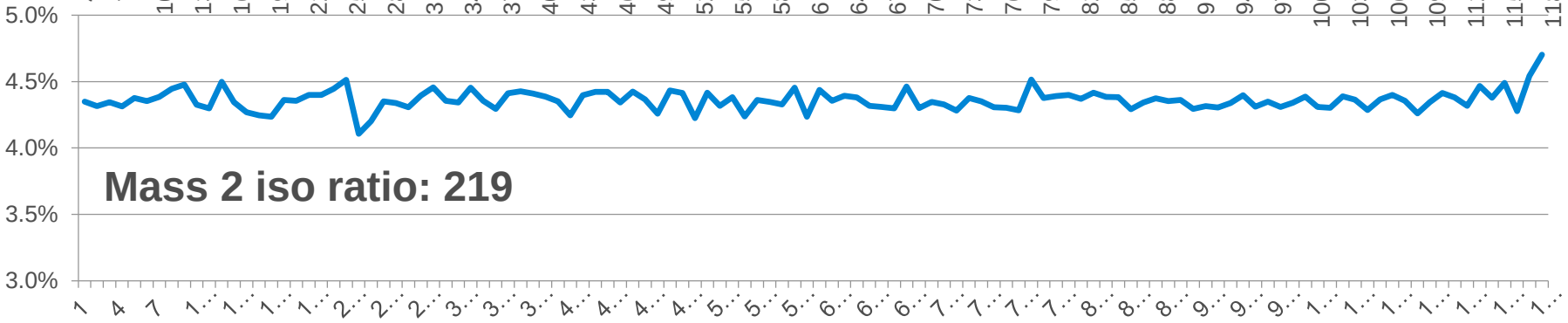
Now over 2 years

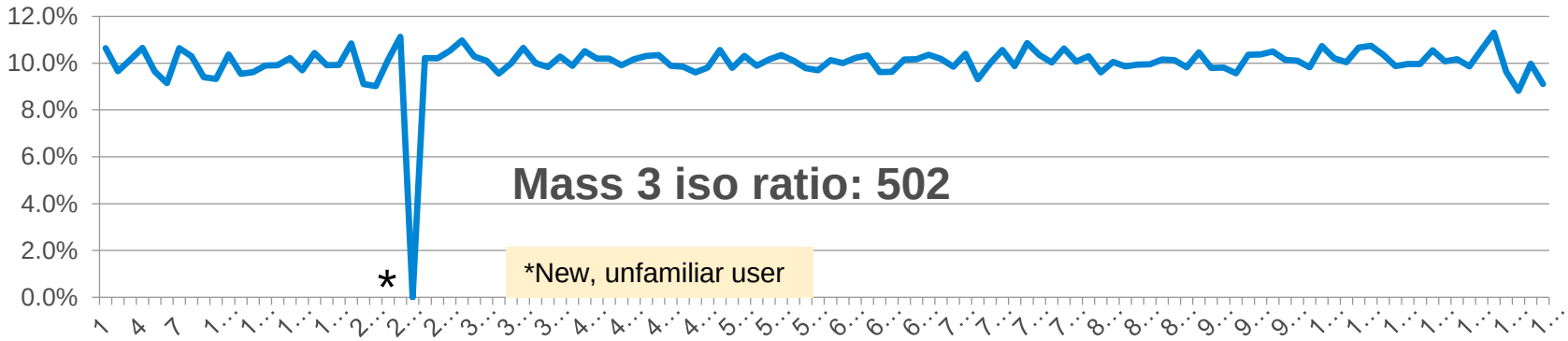
Material Lab – Pyrolizer Application

System verification: ~2 times / week

Tuning#	Date and Time
1	2014/8/19 14:12
118	2015/9/14 18:33







Pyrolyzer manual cleaning frequency - Japan

Standard system

August 2014	Septembe	October	Novemb
Decembe	January	February	March
April	May	June	July
August 2015	Septembe	October	Novembe
December	January	February	March
April	May	June	

Monthly

JetClean system

August 2014	September	October	November
December	January	February	March
April	May	June	July
August 2015	September	October	November
December	January	February	March
April	May	June	

No Cleaning in 23 month!

Clean Only (batch mode) Results

Clean Only mode

Prague- Food

- All kinds of fruits, vegetables, cereals, including very dirty tea samples
- Ultratrace level pest. (1ppb-250ppb) ~160 comp.
- No Analyte protectants
- SANCO QA/QC

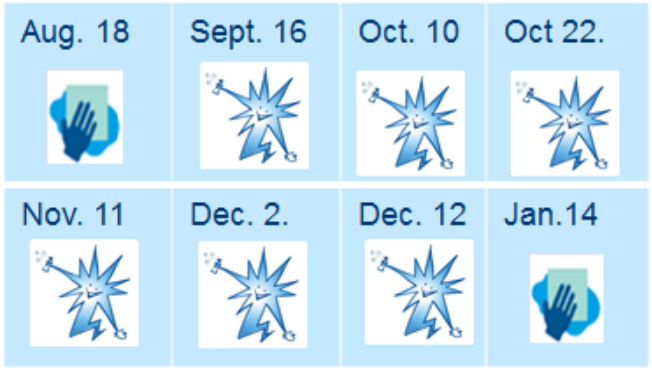
- **Sample preparation:**

QuEChERS extraction → Clean-up PSA & $MgSO_4$ → GC-MS/MS

- **Comparison was done on matrix matched calibration standards prepared from apple matrix**

Standard system:
monthly MANUAL cleaning

JetClean:
manual cleaning 80% reduced



Additional Applications

Material:

Detection of Low Level Contaminants in Ethylene and Propylene with a High Efficiency MSD Source and the JetClean Self-Cleaning Ion Source

PH_3, H_2S, AsH_3, COS, at sub pg levels, 120 m x 0.32 mm id x 8.0 µm
JetClean prevents column bleed contamination and delivers consistent results

Using the JetClean Self-Cleaning Ion Source to Extend Maintenance Free Operation

Detection of 16 Phthalates (phthalate esters) with consistent results

Food:

Significant Robustness Improvements of PAHs Analysis in Palm Oil Using the JetClean Self-Cleaning Ion Source in a GC/MS/MS system – WP209

European Regulation 1881/2006

Maintaining Sensitivity and Reproducibility with the JetClean Self-Cleaning Ion Source for Pesticides in Food and Feed

Pesticide residue in Organic honey

Why JetClean?

- **Reduced cleaning frequency:**

  - **Higher productivity**
  - **Convenience**

  - **Serviceable by less experienced operators**

- **Readily applicable to all markets and user types**

- **Upgradeability**


Thank
You
Merci
Gracias
Spacibo
Danke
Arigatô
Hvala
KamSahHamnida
Xièxie
Mèsi
Grazie
aDank
Takk
TapadhLeat
Köszönöm
Murakoze
WaadMahadsantahay
Buznyg
ThintKo
Blagodaram
Rahmat
Kasih
Terima
Matondo
Mercé
Taiku
Dakujem
Gràcies
Faleminderit
Efharisto
Najis Tuke
Grandmercé
Nirringrazzjak
Bayarlalaa
Obrigado
Salamat
Saha
Multumesc
CámOn
Gracie
GratiasAgo
Chnorakaloutioun
TänanVäga
Tak
Sagolun
Dankie
Ačiū
GratiasAgimus
Motashakkeram
KopKhunKha
Gratzias
Tenki
Tanemirt
Dziakuju
Chokrane
Kiitos
Mauruuru
Barkal
Aabhar
BarakAllahuFiik
Grazzi
Dhanyavaad
Mamnun