

Tuesday Afternoon Poster Session 12900-1800P

Minimizing Inlet Artifacts in GC Analysis – When “Deactivated” is Not Inert Enough

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Abstract.

Artifacts in GC analysis has been the topic of discussion for decades. No analysis from environmental to pharmaceutical, forensic to toxicological has been exempt from artifacts. The source of the vast majority of these “artificial results” has been the heated inlet. Although the purpose of the inlet is simply the vaporization of the sample and solvent for transferring the material into the GC column, in many cases this entire process creates artificial results.

The sources of artifacts may be from one or a combination of the following:

1. Thermal decomposition of the analyte(s).
2. Chemical reaction of components in analyte mixture.
3. Active surface effects of the inlet, liner and tubing.
4. Flow perturbations within the inlet.
5. Contaminated inlet.

Classic deactivation of an Inlet system has focused on deactivating a borosilicate liner by reacting the free silanols on the surface with an organochlorosilane reagent. Deactivation in this manner can be temporary, especially in the presence of low levels of organic peroxides, acids or bases.

In our research developing improved Inlets for GC, we have determined that the inlet liner deactivation is only one of many problems. In this Lecture we will present data showing the improved results using our TitanXL installed in an HP/Agilent 6890GC in the classic EPA 8270 analysis. Data showing the improvements in stability as measured from the breakdown evaluation of DDT and Endrin, as well as more uniform, linear response across the entire mass range will be presented. In addition, improved results from samples of interest in pharmaceutical analysis will be presented. Eliminating artifacts is a principal concern in pharmaceuticals as it relates to compliance issues mandated under USC 21 CFR Part 11. Finally, examples of improvements in forensic toxicology analysis will be shown for the analysis and quantification of several common drugs of abuse.