

Purity of benzene

After the issue of the final report iis10C04 on benzene one of the participating laboratories questioned the assigned value for purity (99.9046 %M/M) in July 2011.

This participating laboratory had determined the benzene content using test method ASTM D4492. This test method uses nonane as ISTD and this laboratory did detect that some nonane (approx 50 mg/kg) was already present in the PT sample #11034 before the ISTD was added. See the below chromatograms that clearly identify nonane present as impurity in sample #11034.

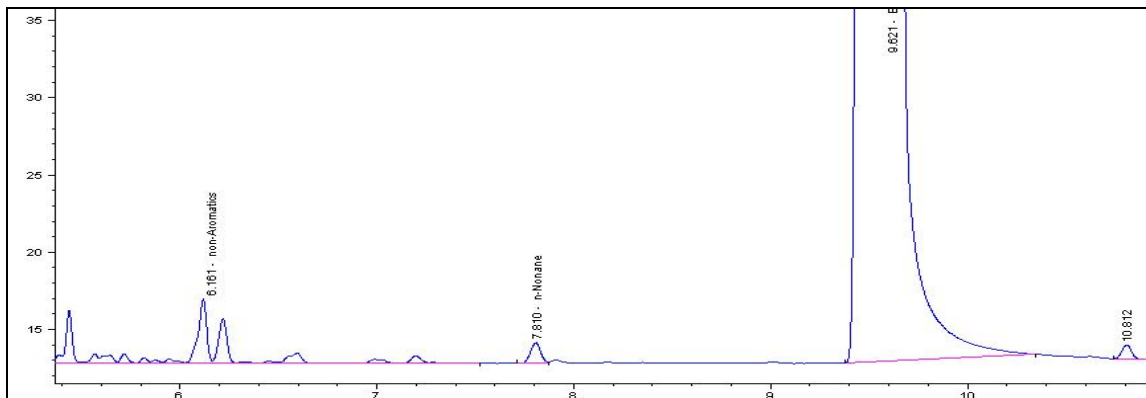


Figure 1: HP-Innowax column, blank #11034 without ISTD.

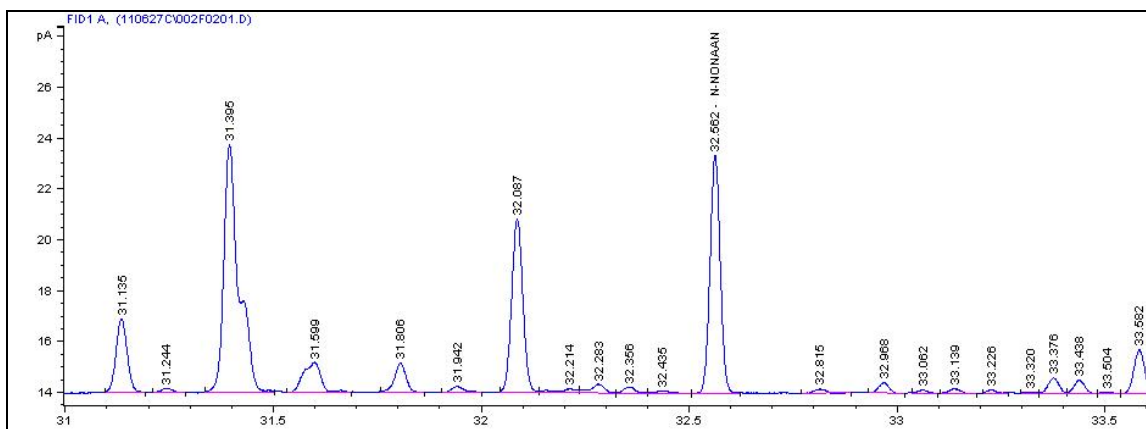


Figure 2: HP-1 column, blank #11034 without ISTD.

As a significant number of participating laboratories used the same test method ASTM D4492 and may also have used nonane as ISTD, an investigation was started. On request of iis, a second laboratory investigated sample #11034 by GC/MS and found that the sample #11034 indeed was contaminated with a small amount of n-alkanes, amongst others nonane.

And because test method ASTM D4492 does not prescribe a blank before adding the ISTD (although it does mention in paragraph 5.2: “*The internal standard chosen must be sufficiently resolved from any impurity and the benzene peak*”), it may very well be that a number of laboratories did not observe that nonane was already present in the sample. Nonane is not a common contamination of benzene.

And consequently the concentrations of the impurities (e.g. nonaromatics) as reported by the laboratories that used test method ASTM D4492 are all suspect to be too low and the benzene content (purity) to be too high.

From the above results it was concluded that the assigned values for GC-impurities and GC-purity as reported in our report iis11C04 of June 2011 indeed may be incorrect due to the unexpected presence of nonane in the sample.