



Application Report: Measurement of composition of oil remainders on metal surfaces by Gas Chromatography

In some cases oils or fat is remained on metallic surfaces, even after cleaning in the production process. The source of these oils are unknown and must be retraced. In this case it is useful to measure the composition of the oils by GC-MS or alternatively by HPLC-MS. This analysis is widely used for quality control or replication measurements, and can be performed by MATinspired. Chromatography-MS is a very common technique, and many variations are available for a wide range of analysis purposes. For all techniques MATinspired has expertise available. A full sample analysis is performed in one run, so this method is relatively cheap and reliable. Detection of almost every chemical is possible in ppm range, and depending on the type of chemical under investigation often as low as ppb.

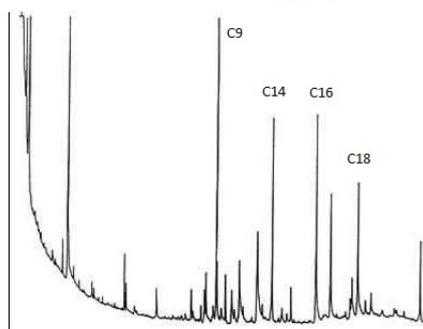


Figure 1. Typical example of an oil composition chromatogram, without MS data, in the order of g/ml. The height of the signal is a measure for the amount of product present.

General applications of Chromatography

Chromatography can be used for a wide range of applications. It could for example be used for quality control, for research analysis, for purity control etc. Due to the different sorts of chromatography practically all types of chemicals can be analysed, provided that they dissolve. Polar and apolar compounds can be analysed. Gasses can be analysed by GC, onwards to very heavy (10.000 g/mol) molecules by SEC. Ions can also be specifically analysed by ion-chromatography.

Principle of a chromatography measurement

In chromatography, the different substances that undergo chemical analysis are first separated by a column. The separation is based on the differences in affinity of the compounds with the column material, every compound travels through the column at its own speed. After separation they are injected into a gas stream which is fed into a flame, and the optical spectrum is captured. Retention time is the predominant identification factor here, the optical spectrum is for quantization. When GC-MS analysis is performed, the compounds are fed through an ionizer, which creates charge on, and shatters individual molecules. The ions are then accelerated into a magnetic field, which bends the trajectory of each ion based on the ration of weight and charge, the amount of hits per ratio is measured. The amount of ions counted by the MS is a indication for the amount present in the sample.