EUROPEA UNION
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Development Fund

Mecklenburg
Vorpommern
MV tut gut.

Gas Chromatograph with two Flow Lines incl. two Flame Ionisation Detectors

Thanks to funding from the European Regional Development Fund (ERDF), the Wismar University of Applied Sciences was able to acquire a modern analyser for research in the field of pollutant degradation. 75 % of the funding came from ERDF funds from the state of Mecklenburg-Vorpommern and 25 % from university funds.

Measuring Method

Gas chromatography (GC) is an analytical method used to separate and identify gas mixtures. A sample is converted to a gaseous state and passed through a column through which a carrier gas flows. The individual components of the sample interact differently with the stationary phase of the column, resulting in a separation based on their physico-chemical properties. A detector measures the quantity of the individual components, and identification can be made by comparison with reference substances.

The detector used here is a flame ionisation detector (FID). It is based on the measurement of ions produced during the combustion of organic compounds. In an FID, the sample is passed through a burning hydrogen flame, which ionises molecules in the sample. The resulting ions generate an electric current that is measured by the detector. The intensity of the current correlates with the quantity of the analysed substances, which enables quantitative analysis. The FID is particularly sensitive to compounds containing hydrogen and is often used in the analysis of organic compounds in gas chromatography applications. The GC can fulfil different separation requirements with two separate flow lines (columns) and two detectors (FID). The sample to be analysed can be fed via two different injectors (split/splitless and on-column injector).

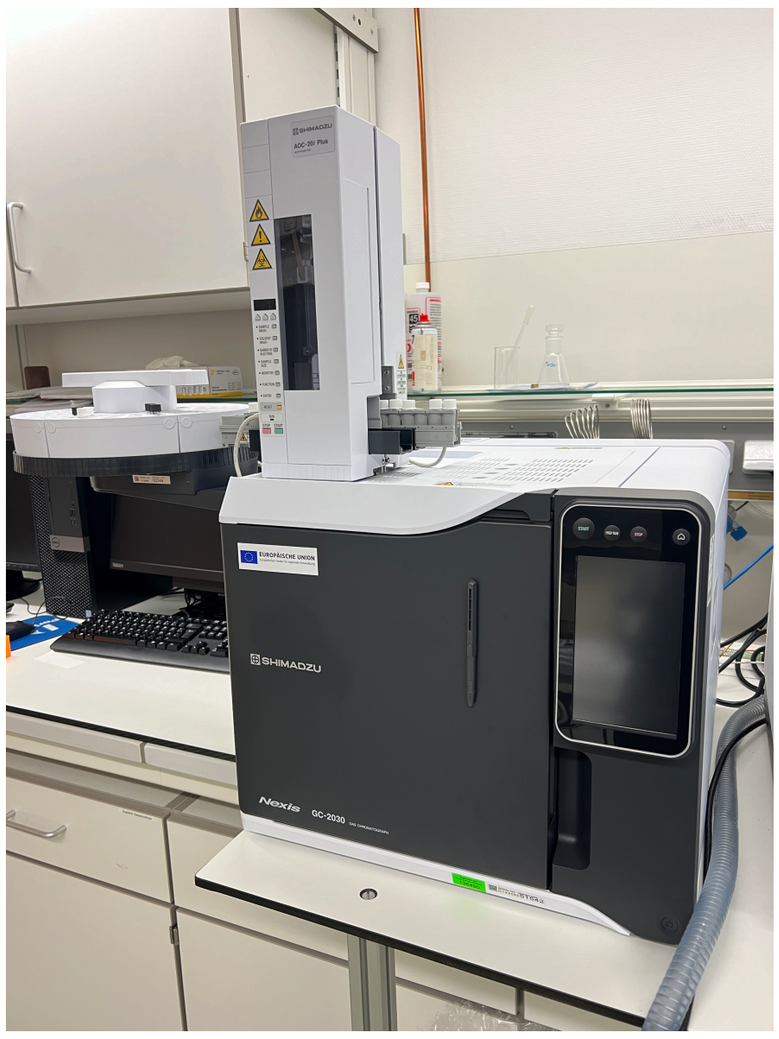

Figure: Gas chromatograph with autosampler for split/splitless and on-column injector (set-up). After injection, the vaporised sample is separated according to components in a column through which carrier gas flows and quantified using FID.

Application in Research

As part of two research projects, Wismar University of Applied Sciences is working on the development of new methods for the degradation of PAHs and micro-pollutants in soil and in an aqueous environment. To this end, it must be possible to determine the concentration of the pollutants and any degradation products that are formed.

Specifications

- o Capillary gas chromatograph GC-2030 AF (Shimadzu)
- o Autosampler for 150 samples
- o Split/splitless injectors
- o On-column injector
- o Parallel operation on two columns
- o Two flame ionisation detectors (FID)

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