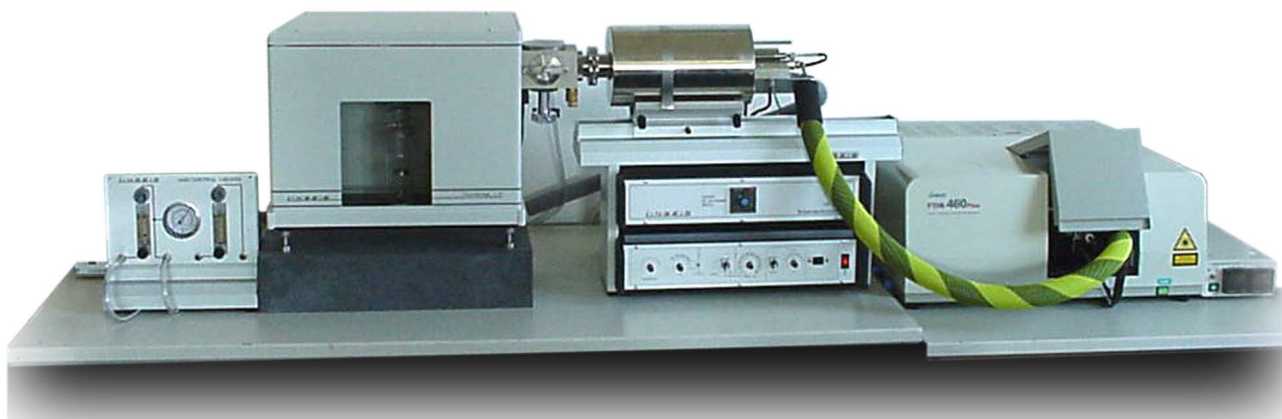


LINSEIS / JASCO Thermal balance/FTIR

Evolved Gas Analysis EGA with TG / FTIR coupling technique



This instrument consists of a horizontal Linseis balance series L81 which is coupled with a JASCO FTIR spectrometer series 460.

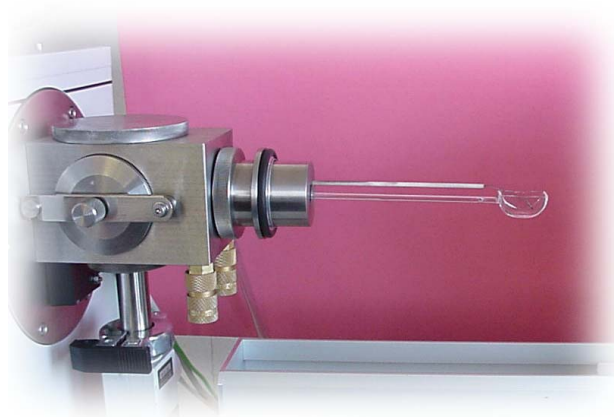
This combination of 2 instruments enables to measure the change of weight over temperature and the evolved gas analysis by means of the JASCO FTIR in a temperature range from -150 up to $+500^{\circ}\text{C}$.

Other temperature ranges up to 1550°C are also possible by using a different type of furnace.

The used Linseis thermo balance L81 has a horizontal measuring system which can measure weight changes with a resolution of 1 microgram. The furnace is a low temperature furnace which can go as low as -150°C by use of liquid nitrogen.

The maximum temperature is 500°C .

The sample holder is made out of quartz and has a relatively large volume of 3ml. The samples are placed in the sample holder and are usually solids or powders.



LINSEIS

By use of a manual gas control box two different gases can be applied to the sample and the gas stream can be controlled. A manometer is used to control the pressure on the measuring system.



The coupling between the thermo balance L81 and the FTIR spectrometer from JASCO is made through a heated steel capillary. This capillary connects an open ended protection tube from the thermobalance with the input of the FTIR spectrometer. There are two more controlled heating zones at the output of the balance furnace and at the input and measuring zone of the FTIR spectrometer.

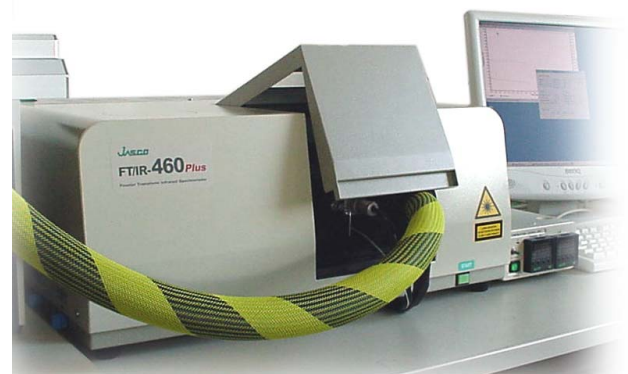


The system has the possibility of a connection to a vacuum pump. This enables to draw a vacuum at the beginning of a measurement and then to fill the measuring chamber with a high purity nitrogen gas. This gas will then also carry the evolved gases, which are coming out of the sample (when heating up) into the FTIR spectrometer.

The FTIR spectrometer from JASCO is a high precision system which can detect the gases that are coming from the balance.

It is scanning the incoming gases with different wave length and measures absorption spectra. These spectra are stored in the computer and are then compared with existing libraries to determine what the evolved gases are.

There are a lot of different libraries available that can be purchased for different applications. As standard a general library with 8000 different spectra is delivered with the system. There are additional highly specialized libraries available for purchase for different application fields. For example there are libraries for gases and vapors, for pharmaceuticals, for chemicals etc.



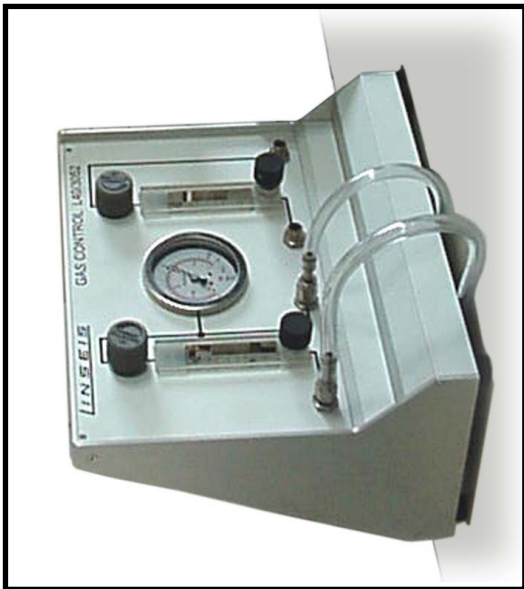
The measuring cell in the JASCO FTIR system is a special development that was made in cooperation between JASCO and LINSEIS.

A special design was used to ensure that the Windows (ZnSe) are heated and easy exchangeable. This way no condensation can occur and if necessary the Windows can easily be removed. Also the beam length within the absorption chamber is extended by use of a mirror system. This amplifies the resulting absorption signal.

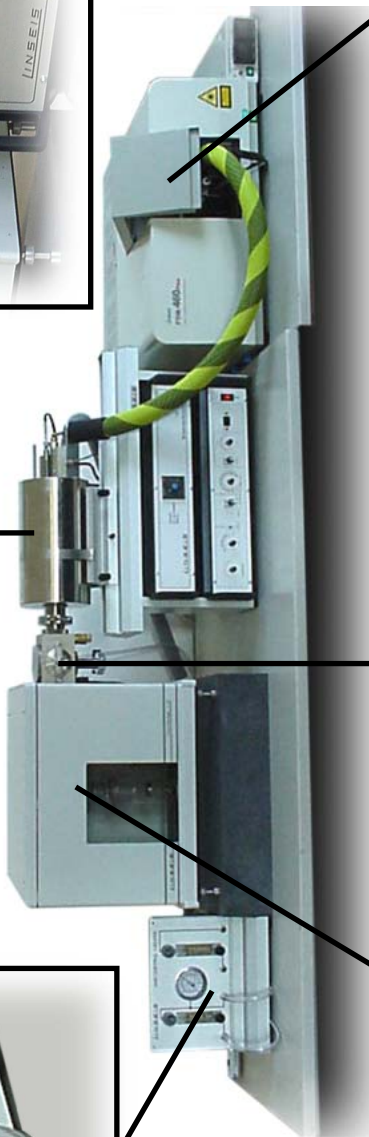
Overall the Linseis / JASCO EGA system with coupling technique is a very powerful tool that can be used in many different applications and that delivers information that can otherwise not be achieved if only single measuring techniques are used.

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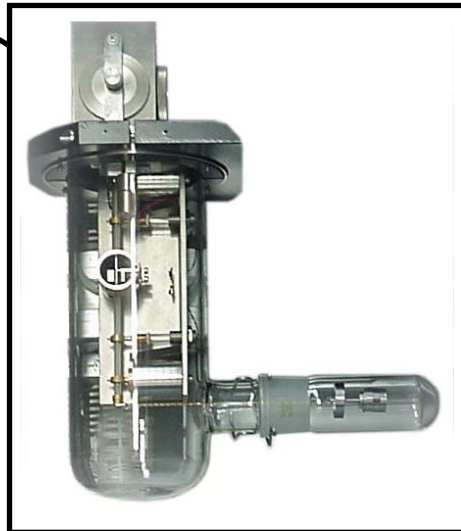
2 times gas control station
with integrated manometer
which display the system
pressure



Low temperature furnace
with temperature range
-150°C up to 500 °C, with
coupling to a FTIR -
gasanalysis system



Details of the Thermal
balance L81



FTIR - gasanalysis system
(FTIR 460 plus)



Details of the horizontal quartz glass
measuring system