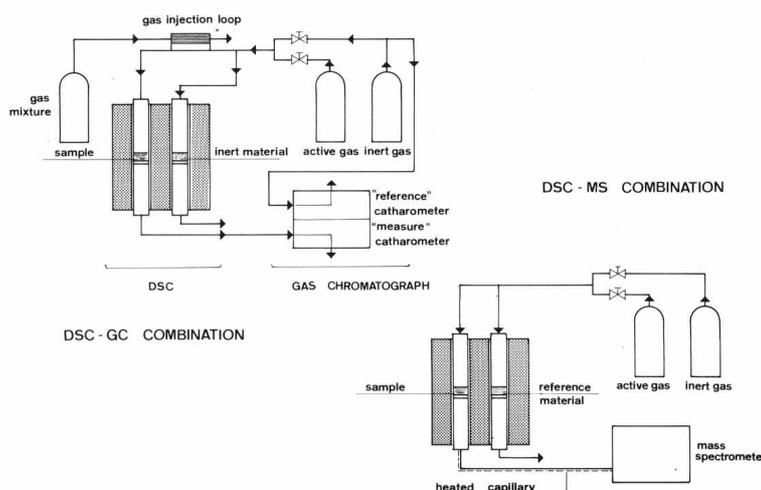


Gas adsorption and gas analysis (gas chromatography, mass spectrometry)



Experimental

The combination of thermal analysis with evolved gas analysis is frequently used in order to characterize the exhausted gases of a reaction. Such a connection requires a continuous circulation of gas through the instrument, with an easy fitting of the EGA apparatus. The open structure of the Sensys is particularly interesting for such a combination.

The quantitative measurement of both heat evolved by a sample and the amount of gas emitted is made possible, giving a great interest for the better comprehension of the reactions occurring during the experiment. This is particularly powerful for gas-solid interactions, like adsorption in the catalysis field. Two types of combination are described : DSC-gas chromatography and DSC-mass spectrometry using the silica reactor (see TN225).

DSC-GC combination

The silica reactors containing respectively the sample and an inert material are continuously swept by a flow of inert or active gas.

The gas coming out from the « sample » reactor goes then through the « measure » catharometer of the gas chromatograph.

An independent circulation of inert gas is used to sweep the « reference » catharometer.

An injection loop of known volume can also be added to the gas circuit. It allows the introduction of various reactant gas in the inert carrier gas, for running pulsed gas adsorption. (The SETARAM supply is limited to the DSC and the reactor).

DSC-MS combination

Compared to a gas chromatograph, a mass spectrometer allows a more rapid identification of the evolved gas phase components. Therefore the DSC-MS combination is very interesting in the case of continuous gas adsorption. The sample and reference materials located in the silica reactor are under continuous flow of gas during the experiment.

The gas collection is performed at normal pressure by means of a capillary, located very close from the sintered glass substrate. In order to prevent condensation of the gas at the outlet of the reactor, the capillary is heated up to the mass spectrometer inlet.

Instrument
Sensys evo
(-120 to 830°C).



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