

## List of available analysis service techniques

The possible analysis services are listed below. This list presents all the available techniques, but is not exhaustive as regards to the possible applications.

### DSC (DIFFERENTIAL SCANNING CALORIMETRY)

#### DSC analysis from $-120^{\circ}\text{C}$ to $1600^{\circ}\text{C}$ :

Examples:

- ▶ Melting, crystallization
- ▶ Tg, phase transition
- ▶ Controlled atmosphere
- ▶ Controlled pressure (up to  $800^{\circ}\text{C}$ )
- ▶ Purity
- ▶ Kinetics
- ▶ Oxidation induction time

#### MicroDSC analysis from $-20^{\circ}\text{C}$ to $120^{\circ}\text{C}$ :

Study of low-energy transformations.

Examples:

- ▶ denaturing of protein solutions ( $c > 0.5\%$ )
- ▶ melting / jellification of polysaccharides

#### Measurement of $C_p$ :

On solid and liquid samples from  $-20^{\circ}\text{C}$  to  $1550^{\circ}\text{C}$

### CALORIMETRY

#### Calvet Calorimetry from $30^{\circ}\text{C}$ to $300^{\circ}\text{C}$ :

Isothermal mode measurement of heats of solid-liquid mixes (wetting, dissolution, adsorption), liquid-liquid (dilution, reaction, etc.), solid-gas or liquid-gas (oxidation, adsorption, etc.).

Programmed mode measurement on large samples (up to a few grams): melting, decomposition possibly under controlled or measured pressure.

#### Reaction calorimetry from $0^{\circ}\text{C}$ to $150^{\circ}\text{C}$ :

Measurement of heat of reaction under normal pressure.

### THERMOGRAVIMETRY (TGA, TG-DTA, TG-DSC)

#### TG: Thermogravimetry from $20^{\circ}\text{C}$ to $2400^{\circ}\text{C}^*$ :

Measurement of weight variations associated with the temperature and/or atmosphere used

Atmospheres:

- from  $20^{\circ}\text{C}$  to  $1750^{\circ}\text{C}$ : air,  $\text{O}_2$ ,  $\text{H}_2$ ,  $\text{N}_2$ , He, Ar
- from  $1750^{\circ}\text{C}$  to  $2400^{\circ}\text{C}$ : He

#### TG-ATD from $20^{\circ}\text{C}$ to $2400^{\circ}\text{C}^*$ :

Measurement of weight variations and the DTA effects associated with the temperature and/or the atmosphere used.

Atmospheres:

- from  $20^{\circ}\text{C}$  to  $1750^{\circ}\text{C}$ : air,  $\text{O}_2$ ,  $\text{H}_2$ ,  $\text{N}_2$ , He, Ar
- from  $1750^{\circ}\text{C}$  to  $2400^{\circ}\text{C}$ : He

#### TG-DSC from $-100^{\circ}\text{C}$ to $1600^{\circ}\text{C}^*$ :

Measurement of weight variations and the DSC effects associated with the temperature and/or the atmosphere used.

Atmospheres:

- from  $20^{\circ}\text{C}$  to  $1600^{\circ}\text{C}$ : air,  $\text{O}_2$ ,  $\text{N}_2$ , He, Ar

## THERMO MECHANICAL ANALYSIS (TMA) AND DILATOMETRY

### Dilatometry / TMA from 20°C to 2400°C\*:

Measurement of the linear coefficient of thermal expansion

Study of sintering at constant heating rate or at constant shrinkage rate.

Atmospheres:           - from 20°C to 1750°C: air, O<sub>2</sub>, H<sub>2</sub>, N<sub>2</sub>, He, Ar  
                              - from 1750°C to 2400°C: He

## COUPLING TO GAS ANALYZERS (MS AND FTIR)

### \*Coupling with mass spectrometry:

Possibility of coupling with the instruments marked with an asterisk\*

Analysis of vapors emanating from the sample during a TG, TG-ATD, TG-DSC or TMA analysis up to 300°C.

### \*Coupling with FTIR:

Possibility of coupling with the instruments marked with an asterisk\*

Analysis of vapors emanating from the sample during a TG, TG-ATD, TG-DSC or TMA.

## THERMALLY STIMULATED CURRENTS (TSC)

### TSC from -170°C to 400°C:

Measurement of depolarization currents

Determination of T<sub>g</sub>, proportion of amorphous substance (in pharmaceutical compounds)

Dielectric relaxation, plastification phenomena (water)

## THERMAL CONDUCTIVITY AND EFFUSIVITY

### Thermal conductivity and effusivity:

Measurement of thermal conductivity and effusivity between ambient temperature and 180°C on solids, powders and liquids.

Please send requests for quotations to the following address, indicating the type of analysis, the temperature scanning program, the atmosphere, the compatibility with the crucible materials, and the number of samples. The toxicity of the sample as well as the precaution for handling them will have also to be described

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