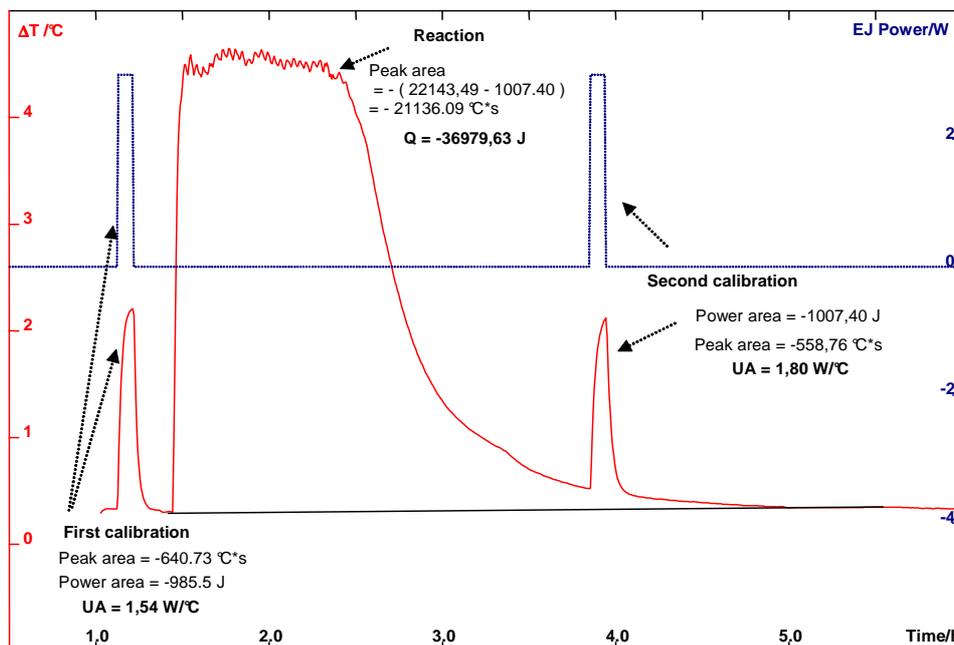


**Study of process in normal conditions by DRC Evolution:
nitration of chlorobenzene**



Experimental :

The following reaction is studied with the DRC :



The reaction is done at 30°C.

In the measure reactor with first introduce 29.5 g (16 ml) of sulfuric acid then 33 g (29.8 ml) of chlorobenzene.

When we produce a first calibration of 3 W during 330 s.

When the signal is stable, nitric acid (26.6 g = 18.7 ml) is slowly added with a syringe pump in 2 hours.

After reaction a second calibration is done in the same conditions.

Conclusion:

During the first calibration, we obtain: UA = 1.54 W/°C.

During the introduction of nitric acid, a rather constant deviation of about 4.5 °C is observed during the first hour; then it decreases slowly. The shoulder visible at time 3.5 h corresponds to the end of introduction of nitric acid.

During the second calibration, we obtain : UA = 1.80 W/°C.

The peak of reaction is integrated.

After subtraction of the heat of the second calibration, the heat of reaction is 37.0 kJ.

The heat capacity of the final product is measured by DSC and is 1.96 J/g.K.

The value of ΔT calculated in adiabatic mode is then :

Instrument :
DRC Evolution
-80 to 150°C



$$\Delta T = \frac{Q}{C_p \times m} = \frac{35,30 \times 10^3}{1,96 \times 89,1} = 20^{\circ}C$$