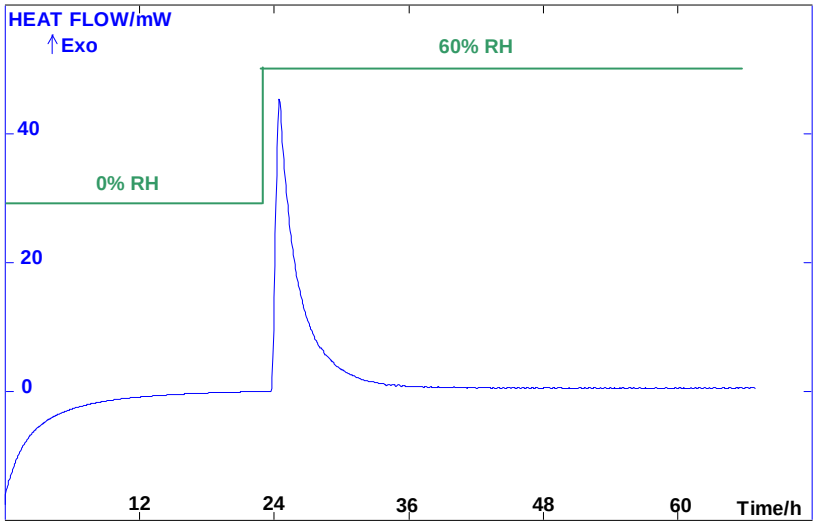
Behaviour of a Drug under Controlled Humidity

Introduction:

Drugs like many other organic material may be found under different forms such as amorphous, crystalline, hydrated. The knowledge and the control of these forms are of great importance as these forms generally determine the bioavailability of the drug. For instance the bioavailability is quite different if the drug is present as amorphous of crystalline for instance.
In the shown experiment, a drug is studied by Calorimetry at constant temperature under controlled humidity. This humidity is null at the beginning of the experiment, then increased to study the behaviour of the drug in these conditions.



Experimental

The C80 calorimeter is used with a flow vessel : the inlet of the vessel is connected to the outlet of Wetsys.

A sample (1.3 g) of drug is placed inside the vessel. The temperature of the calorimeter is 73℃.

In a first phase (24 hours), a flow of dry air is produced inside the vessel.

Then, the level of humidity is rapidly increased from 0% RH up to 60% RH (at 70℃).

Results

During the first phase (under dry air), a dehydration of the drug (endotherm) is observed.

During the second phase, (under wet air), the hydration (exotherm) is observed. This exothermic may be interpreted in two ways:

It may be just due to the wetting of the drug by water, but it also may be explained by the crystallization of the amorphous phase of the drug into a crystalline form.

Instruments

C80
20℃/300℃

Wetsys

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SETARAM Instrumentation
KEP Technologies