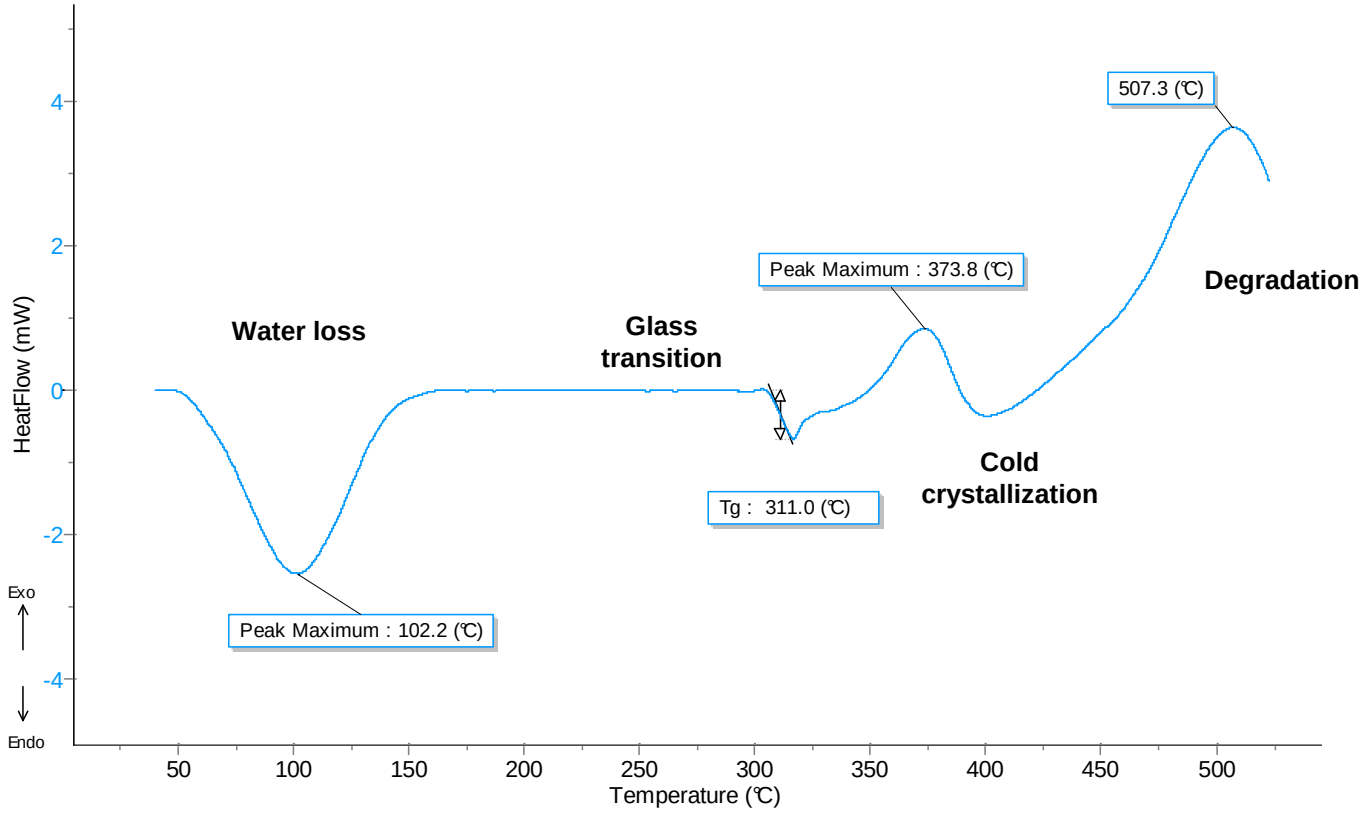
Characterization of a Polyimide by DSC

Introduction

Polyimides are polymers known for their outstanding thermal stability. Indeed, they are well adapted for very tough conditions such as in aerospace, in insulating material or in protective clothing. In the industry, the verification of the resistance of a polyimide requires the knowledge of its thermal profile that is easily obtained with the DSC method.



Experimental

Sample:

Polyimide P84® powder

DSC 131 Evo experimental conditions:

Atmosphere: Nitrogen, atmospheric pressure

Sample mass: about 40 mg in a 100µl aluminum crucible sealed with a pierced lid.

Experimental procedure:

RT ➔ 530℃ at 10℃/min

Results

On the DSC curve, four different thermal events are detected:

- Around 100℃: an endothermic effect corresponding to a loss of water
- At 311℃: a glass transition Tg characterizing the amorphous phase of polyimide (litterature: 315℃)
- At 373.8℃ : an exothermic effect associated with the crystallisation of the amorphous phase (cold crystallization).
- Above 400℃ : an exothermic effect corresponding to the degradation, with a maximum at 507.3℃

Instrument

DSC 131 Evo

-170 to 700℃