

# Characterization of glass transitions of different polymers by DSC

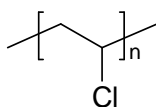
## Introduction

Glass transition is the transformation of a solid or liquid polymer into a vitreous state. This state is characterized by a modification of the polymer physical properties such as viscosity, thermal expansion or heat capacity. The glass transition temperature ( $T_g$ ) is easily determined by DSC. The ISO1135762 standard describes the experimental  $T_g$  determination for polymers

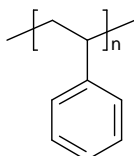
## Experimental

### Samples:

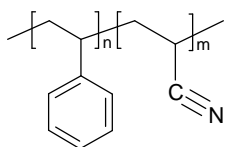
PolyVinyl Chloride (PVC)



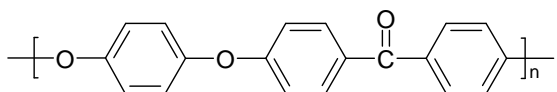
PolyStyrene (PS)



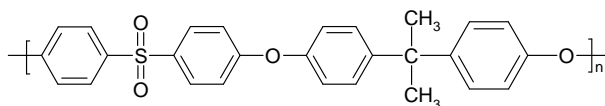
Poly Styrene/AcryloNitrile (SAN)



PolyEtherEtherKetone (PEEK)



PolyEther Sulfone (PES)



### DSC 131 Evo experimental conditions:

Atmosphere: Nitrogen, atmospheric pressure

Sample mass: about 25 mg in a 100 $\mu$ l sealed aluminum crucible

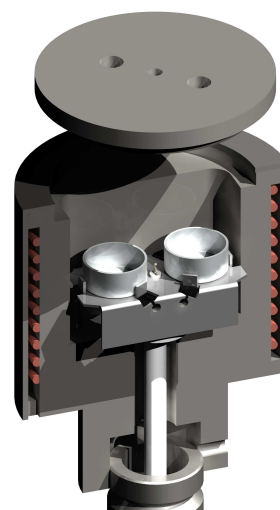
### Experimental procedure:

The temperature is programmed from room temperature up to 300 $^{\circ}$ C at 10 $^{\circ}$ C.min $^{-1}$ .

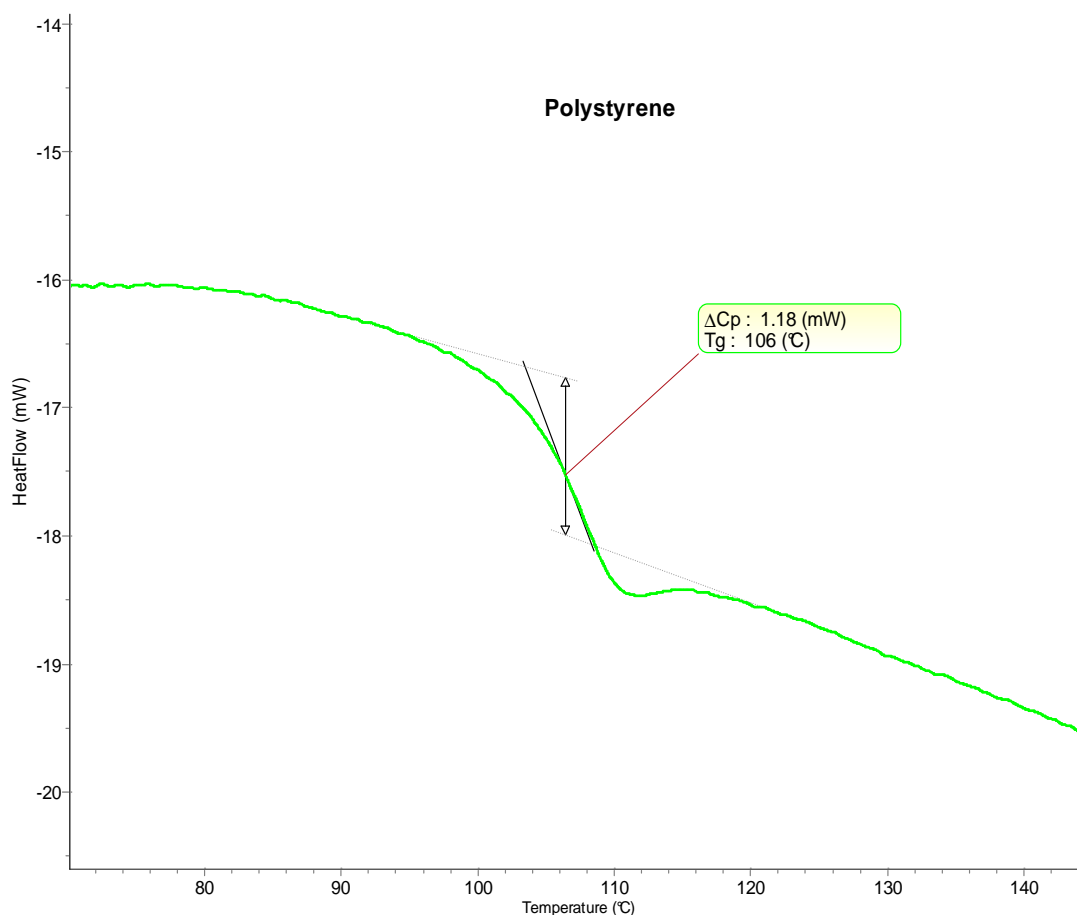
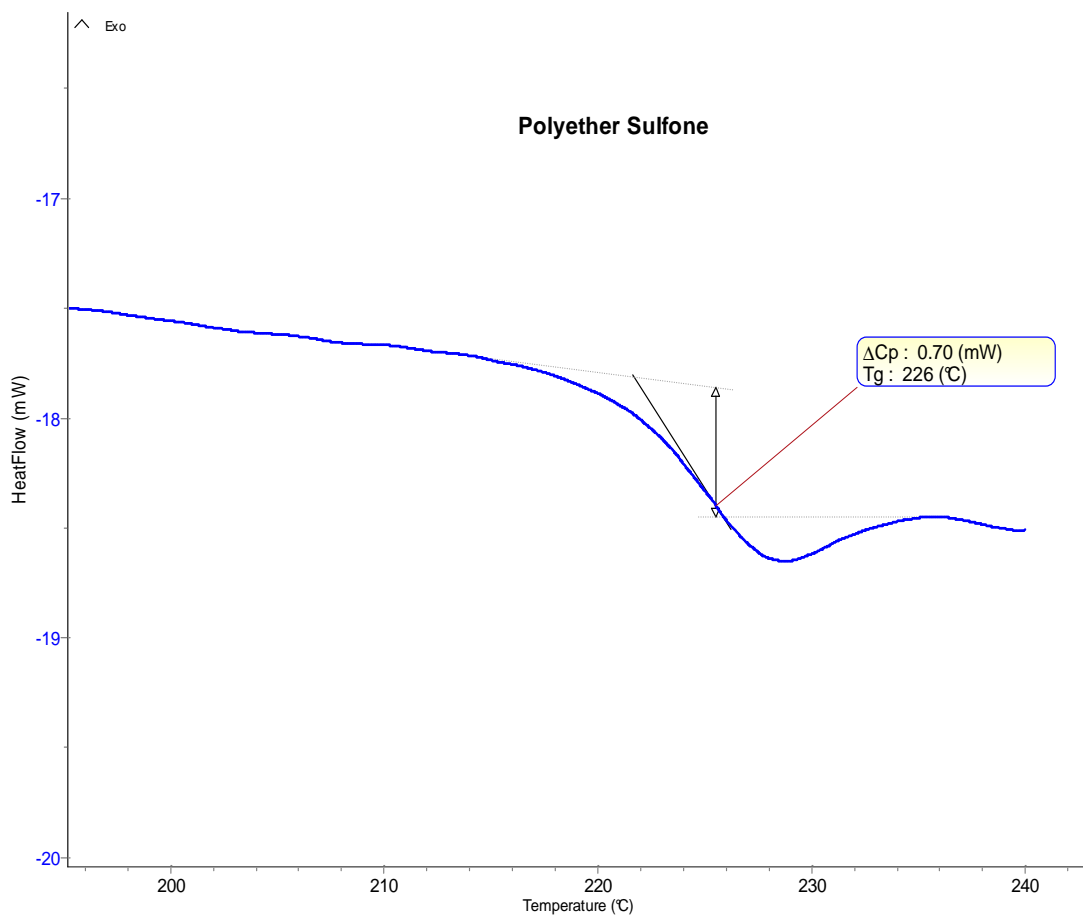
## Instrument

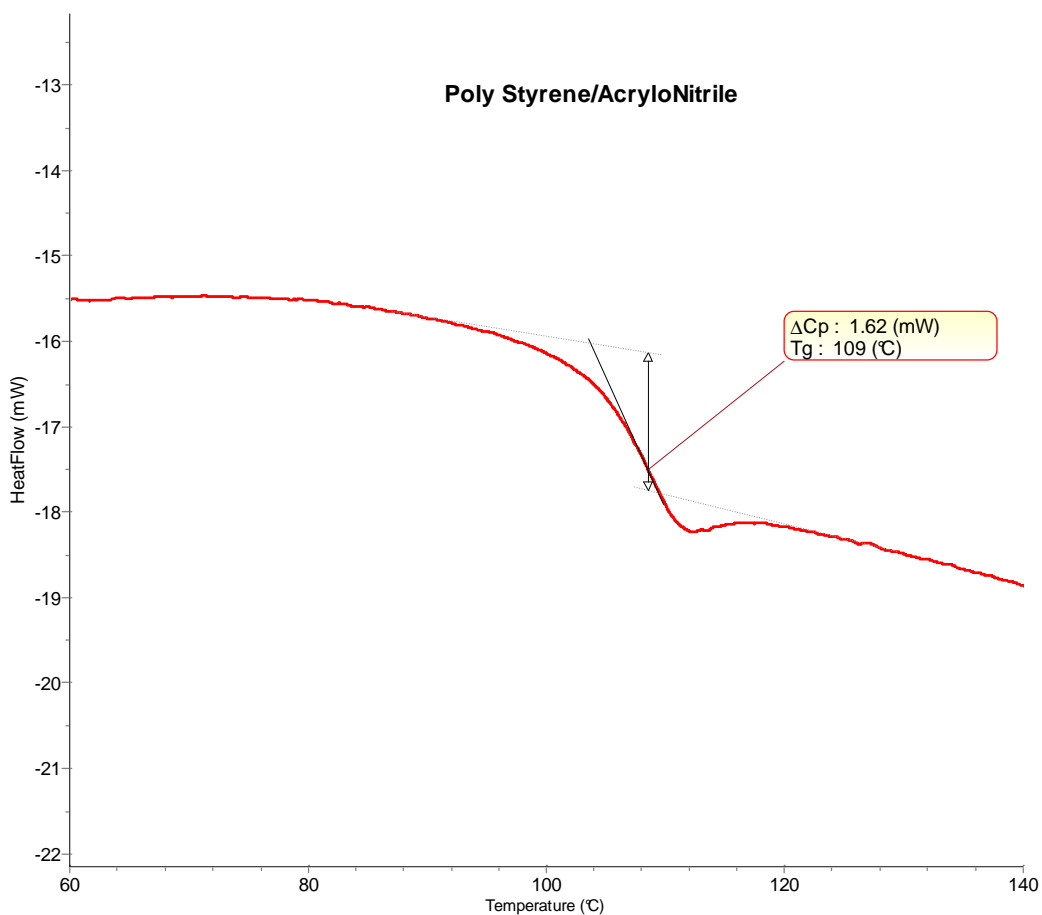
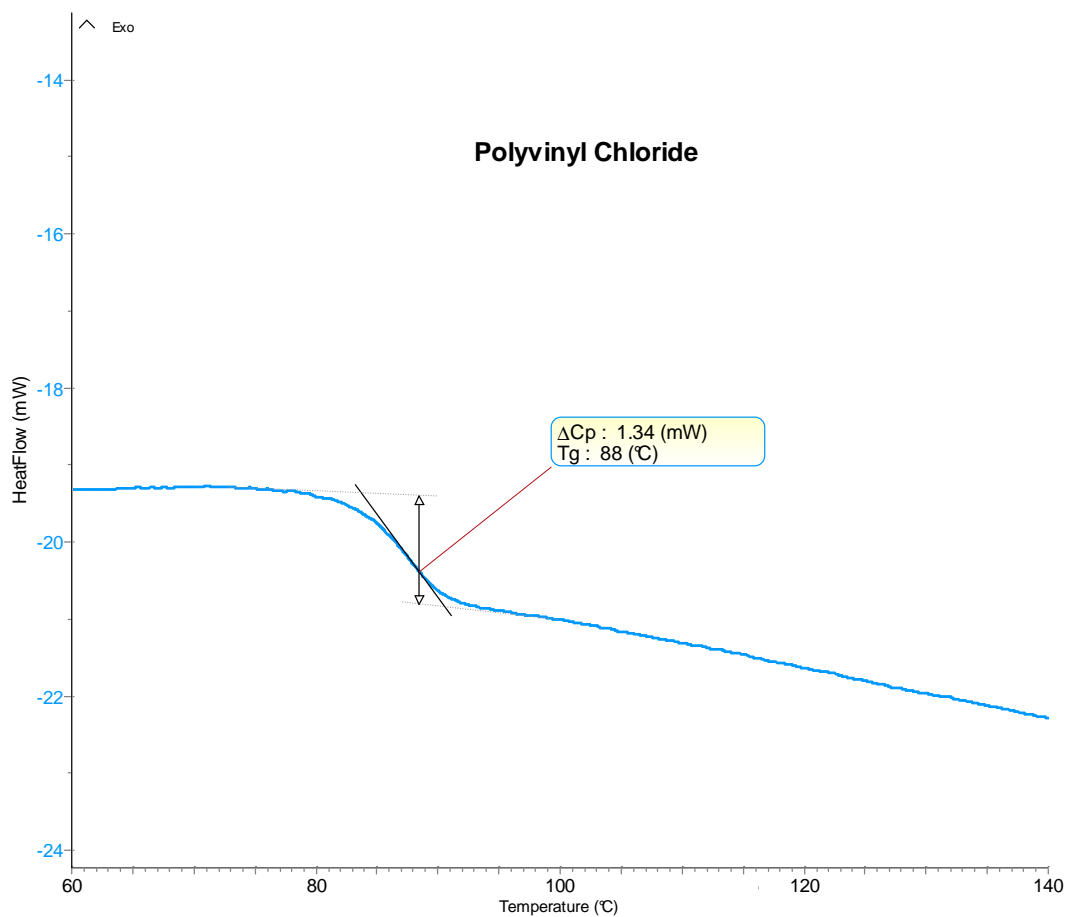
DSC 131 Evo

-170 up to 700 $^{\circ}$ C

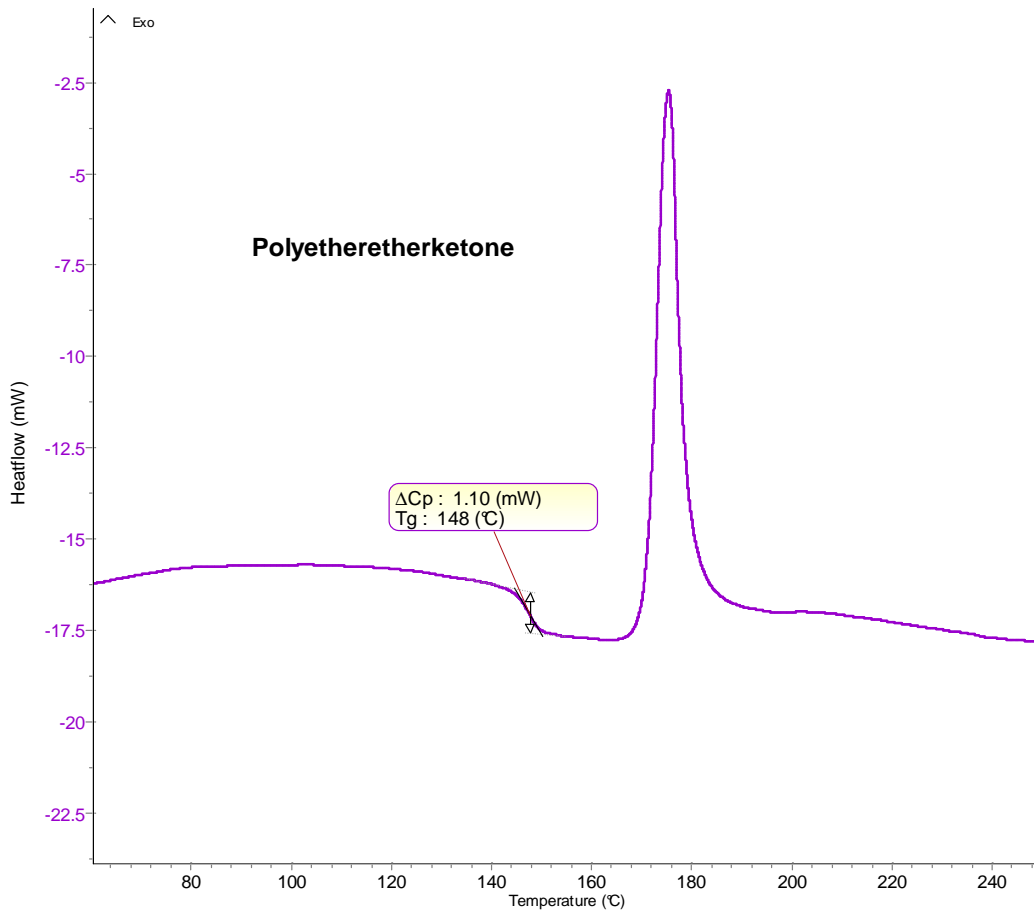


DSC 131 Evo Sensor with aluminum crucibles





# Polymers



## Results

The glass transition temperature corresponds to a shift of the base line which is proportional to the heat capacity variation ( $\Delta C_p$ ). The temperature and the shift depends on the type of polymer.

In this study, PES has the highest  $T_g$  (226°C) and PV C has the lowest (88°C).

