
Unexpected polymerization

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The accident

An explosion destroyed the production unit

After the explosion a fire broke out

Some injured but no dead

The accident occurred during the FIRST industrial batch



Not a chemical reaction, a blending

It was a custom synthesis

Company received the recipe. Before the industrial batch only few lab tests were carried out

It was not a real chemical reaction, but a blending

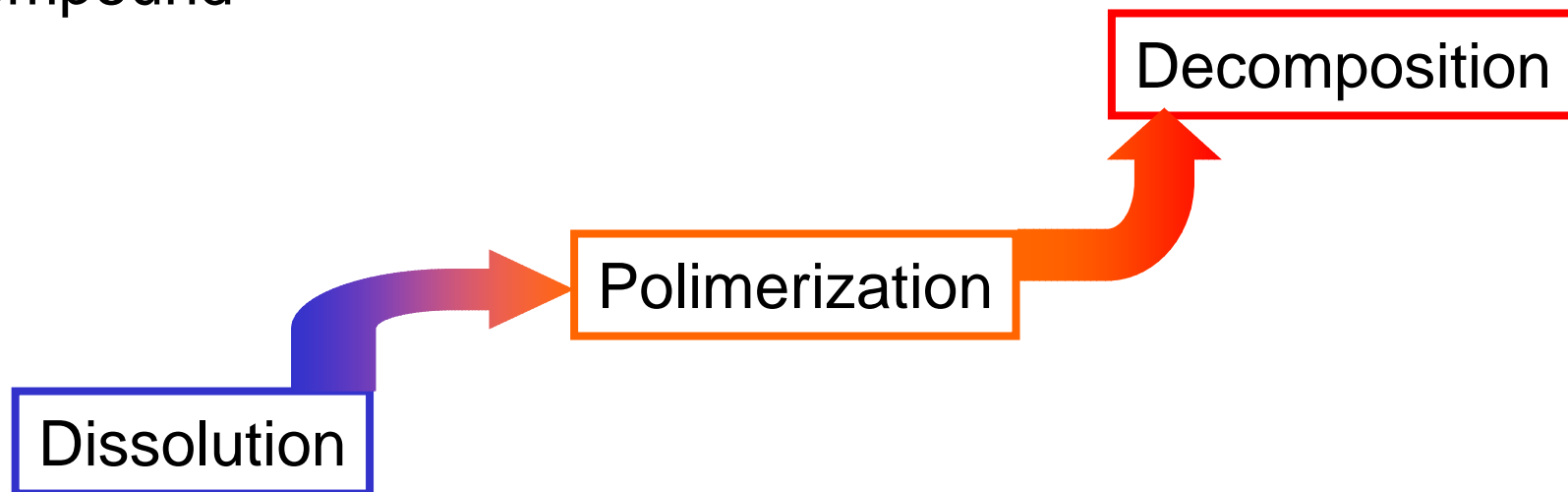
In particular there was the dissolution of a solid compound at high temperature

Not a blending... a polimerization

During the dissolution a wall temperature too high was set

The simple dissolution turned into a polimerization followed by decomposition

The unexpected polimerization was catalyzed by the solid compound



Calorimetric tests – C80

Heat Flow and Pressure Vs Temperature (or time)



Standard test

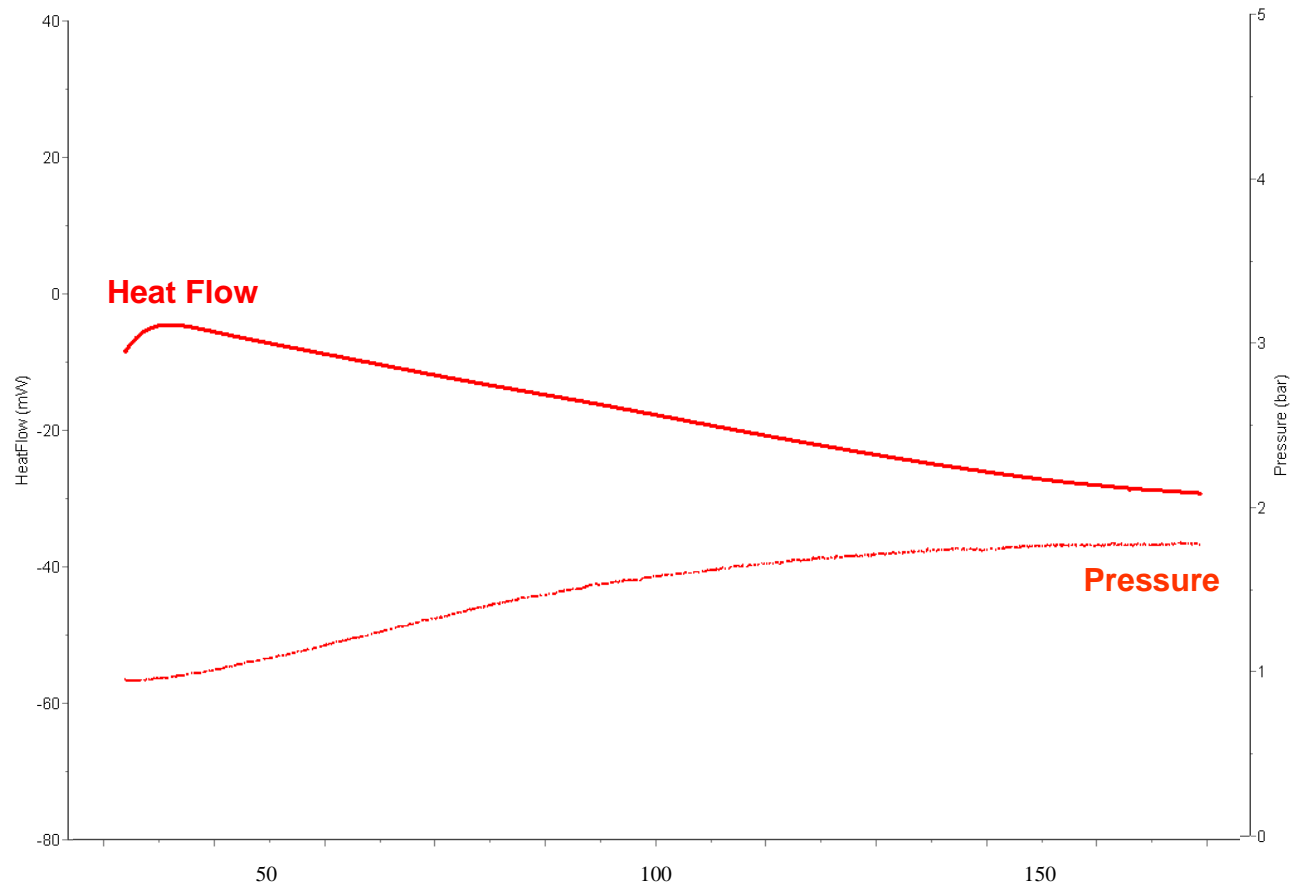
Temperature range: 30 → 280 °C

Scanning rate: 0.3 °C/min

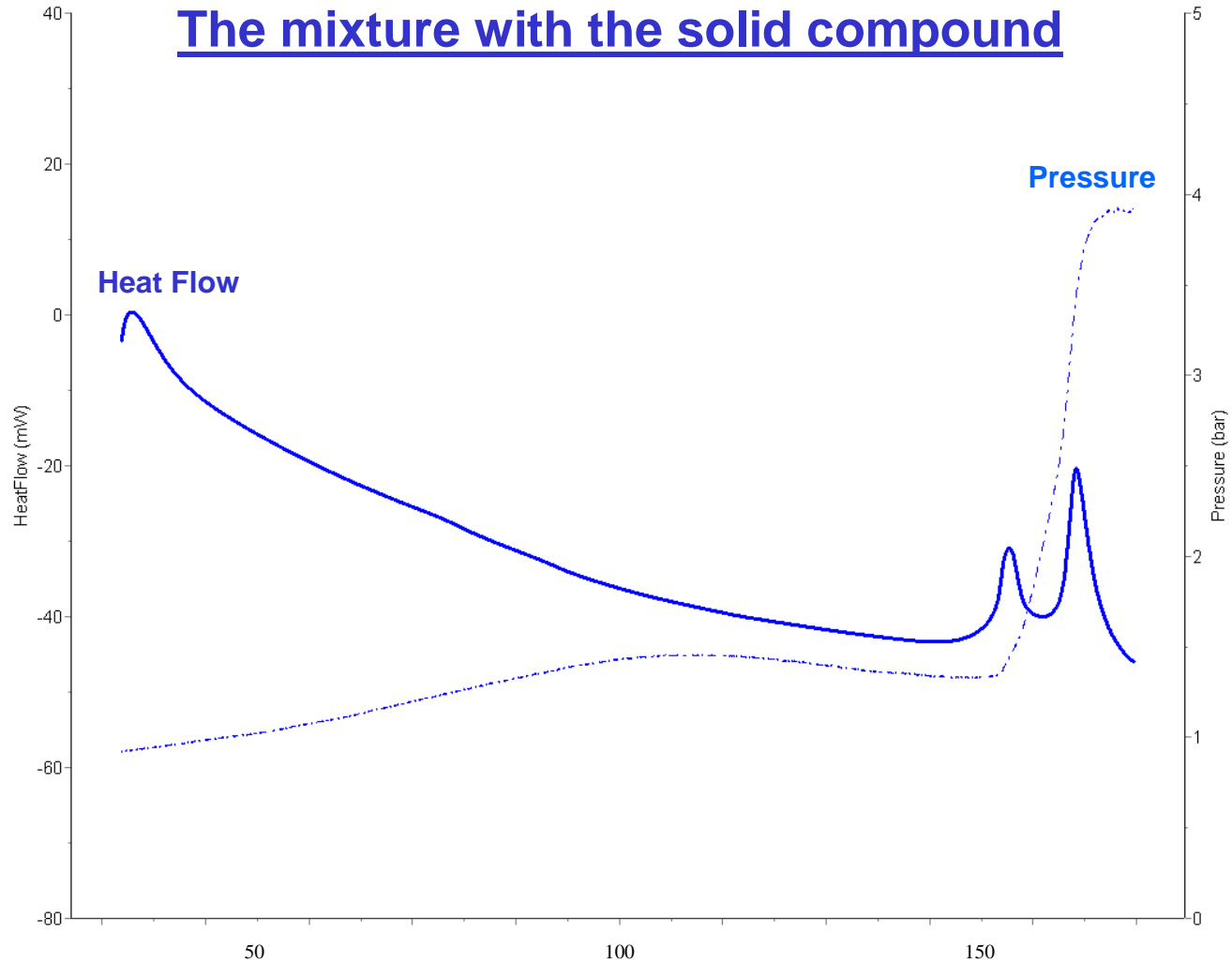
Sample amount: 1 g

Calorimetric tests – C80

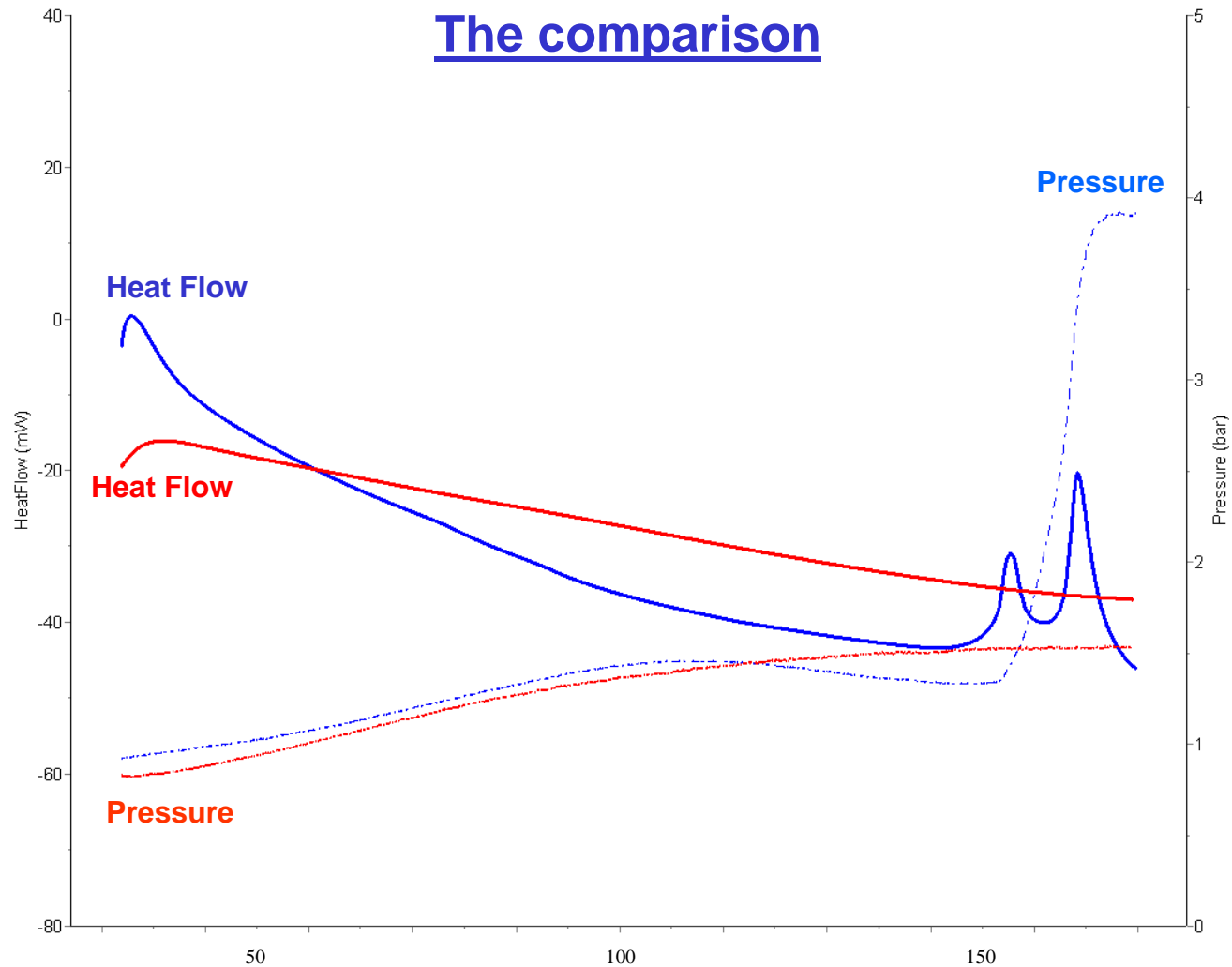
The mixture without the solid compound



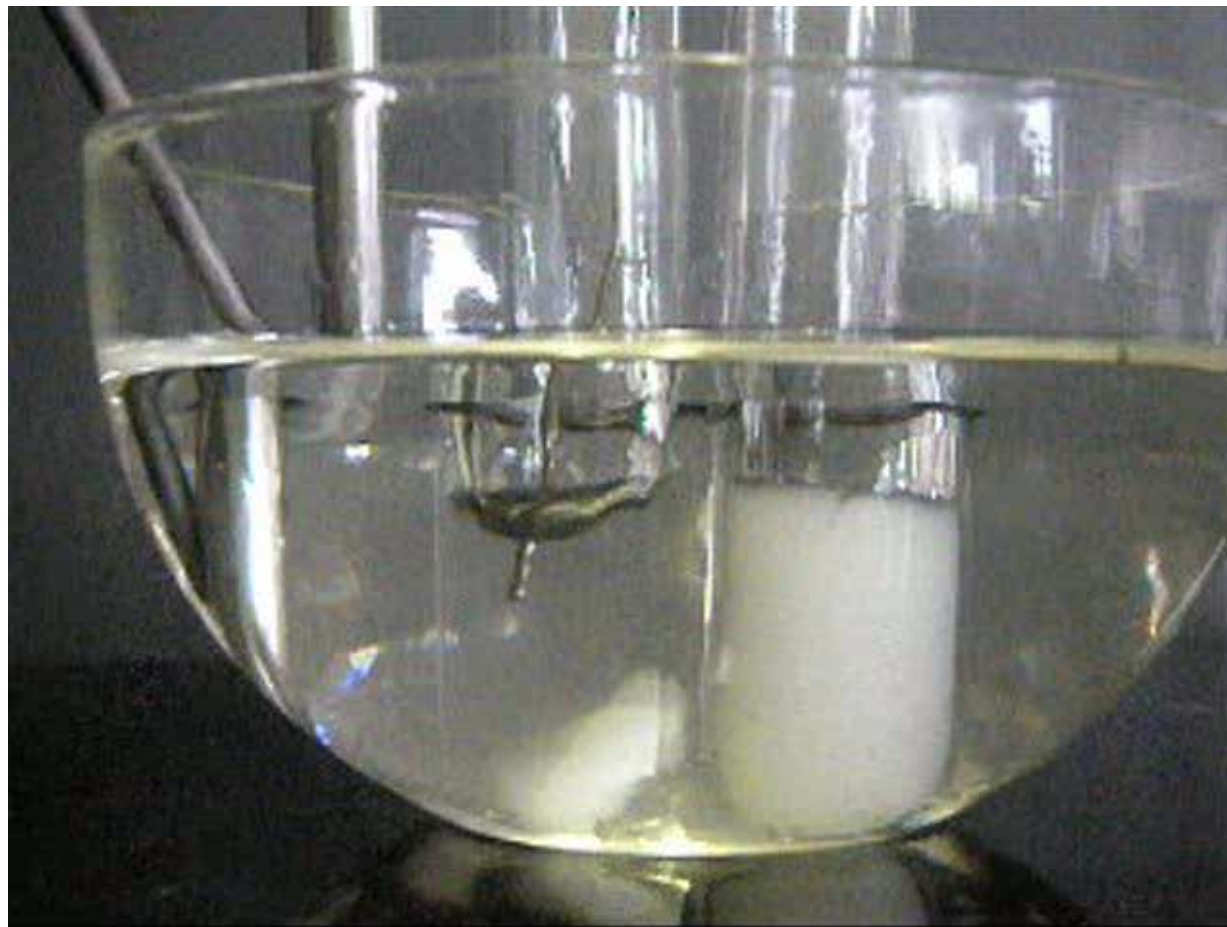
Calorimetric tests – C80



Calorimetric tests – C80



Unexpected polymerization – The comparison



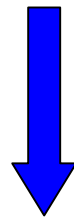
Conclusion

Polimerization was unexpected

No calorimetric tests were carried out

Customer supplied few information; none regarding a polimerization. Did he know anything?

Company didn't ask anything about safety before the industrial batch



Who is the responsible?

