

## ANALYSIS OF CURING OF BIOBASED POLYESTER POLYMER BY DSC

### INTRODUCTION

Fiber reinforced composites (FRC) are increasingly used in structural parts instead of metal, because of their strength, light weight and low cost. For example, blades of wind turbines are often made of FRC. FRC matrix is usually a thermoset resin, whose curing properties can be studied by differential scanning calorimetry, as it is usually associated with an exothermic event. In this study, a team of researcher from Greece investigated the impact of the amount of crosslinking agent on the curing of a biobased polyester.

### EXPERIMENT

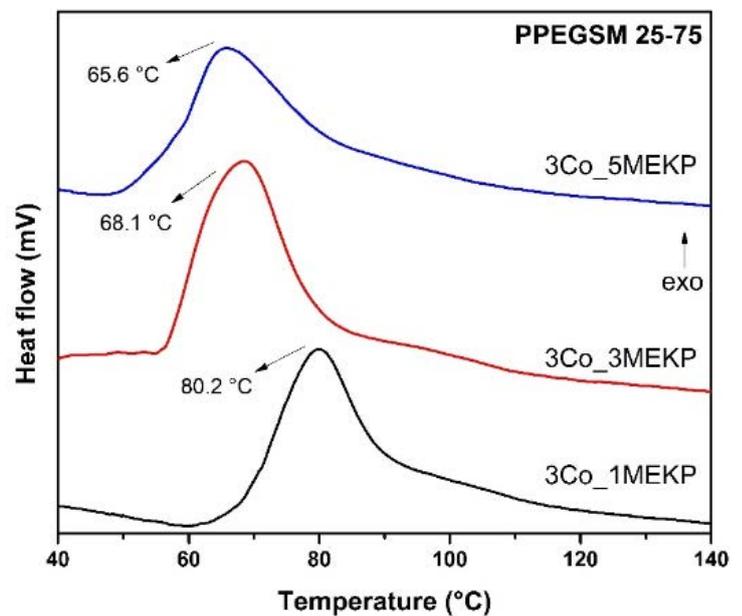
- Sample: 5mg succinic acid biobased polyester with 1%, 3% or 5% of crosslinking agent (MEKP)
- Instrument: Setline DSC
- Crucible: sealed stainless steel
- Atmosphere: N<sub>2</sub>
- Thermal profile: RT to 200°C at 5°C/min

### RESULTS

Upon heating, an exothermic peak is measured. It is due to the curing reaction of the polyester resin. Its onset temperature and profile depends on the amount of crosslinking agent.

A decrease in the onset temperature is measured with increasing curing agent amount. While the onset temperature difference is about 12°C between 1% and 3%, it is less than 3°C between 3% and 5%.

The optimum amount of curing agent can be determined with this simple DSC experiment.



*Papadopoulos, L.; Malletzidou, L.; Patsiaoura, D.; Magaziotis, A.; Psochia, E.; Terzopoulou, Z.; Chrissafis, K.; Markessini, C.; Papadopolou, E.; Bikiaris, D.N. Synthesis and Characterization of Unsaturated Succinic Acid Biobased Polyester Resins. Appl. Sci. 2021, 11, 896*

### INSTRUMENT

#### SETLINE DSC/DSC+



#### EASY TO USE WITH ROBUST SENSOR TECHNOLOGY

ensuring quality, consistent and reliable data

#### AVAILABLE WITH HIGH PRESSURE CRUCIBLES

up to 500 bar at 600°C

#### ACCESSIBLE INSTRUMENT & SENSOR

for easy, cost effective replacement

#### LOWER COST OF OWNERSHIP

through simplified maintenance and a Replacement Parts Guarantee

#### TECHNICAL & APPLICATION SUPPORT

for fast expert help with any questions

#### CALISTO 2.0 EXCLUSIVE SOFTWARE

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