

Presentation Title: Influence of flax fibers on curing kinetics of biobased epoxy resins

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Abstract: Composites with biobased matrices reinforced with natural fibers are a solution envisaged to meet the environmental constraints of industry. However, interactions between these two bio-components remain poorly controlled, which can have significant consequences on the final properties of the material. This work focuses in particular on the influence of flax fibers on the crosslinking of a partially biobased epoxy resin. The understanding of chemical and physical mechanism involved in the crosslinking reaction aims to improve the manufacturing of industrial composites with natural fibers.

Samples of pure epoxy, epoxy reinforced with wet or dried flax fibers were studied in DSC, during and after crosslinking. It appears that the influence of natural fibers on crosslinking varies depending on the water content of the fibers. Indeed, the mixture containing the wet natural fibers showed faster crosslinking than the other two series of samples and the apparent activation energy of these samples with wet fibers showed different values for every conversion degree (*figure 1*).

Analyzed results suggest that chemical nature of the fibers and water they contain has an impact on the formation of the three-dimensional network of the resin.

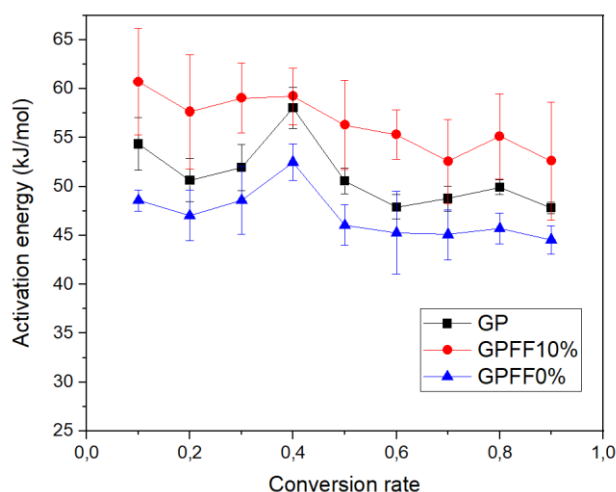


Figure 1: Apparent activation energy of pure epoxy (GP), epoxy with wet fibers (GP/FF10%) and epoxy with dried fibers (GP/FF0%) in function of the degree of conversion