

CirBind

Publieke samenvatting / Public summary

Aanleiding

Many construction materials such as wood panels contain formaldehyde-based thermoset polymer binders. These binders are not safe because they are toxic, hazardous (formaldehyde is carcinogenic), and are persistent pollutants. Examples are melamine-formaldehyde and phenol-formaldehyde resins. There is also a strongly growing market demand for safe bio-based and bio-degradable industrial (polymer) products. No bio-based thermoset is available in today's market. The University of Amsterdam (UvA) has invented Plantics-GX (GX), a unique polymer resin that is safe, 100% bio-based, recyclable, and if it enters in the environment it is bio-degradable. Moreover, it is strong and has very good binding properties. The monomers (partly waste from bio-refinery) are abundantly available and very cost competitive. The spin-off company Plantics B.V. aims to further develop the production process, commercialize this invention and develop applications together with strong (market) partners. With 0.52-0.60 kg CO₂ per kg product the carbon footprint of GX is 5-10 times lower than that of existing thermoset binders (study Process Design Center in Breda) saving 80%-90% on CO₂ emissions.

Doelstelling

CirBind aims the scale-up of the current lab-scale production (kg) of Plantics-GX resin (GX) to a 50-100 kg/batch plant at TRL5. The feedback from three high potential binder applications, partly in an industrial environment, is essential to adjust the production process and design/engineer a flexible production plant. This is done in close cooperation

Projectinformatie / Project information

Projectnummer / Project number

TKITOE CirBind

Subsidiebedrag / Grant amount

€ 1.086.400,00

Algemene informatie / General information

Penvoerder / Secretariat

ISPT

Publicaties en materialen / Publications and attachments

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with knowledge institutes and end-users for selected applications. The resin will induce a step change in the production of this unique bio-based thermoset polymer and the introduction of applications in the Netherlands and Europe.

Korte omschrijving

The project entails both fundamental and application-oriented research together with very experienced knowledge and research institutes, national and international end users. We have six work packages (WP): one WP focusses on scaling up the GX bio-resin production; one WP specifically focusing on the fundamental understanding of the chemistry of the polymerization for different formulations of the bioresin and the interaction with other materials and three WP focusing on development and testing of a specific binder application (one for each end-user). ISPT will take care of the dissemination and the overall project coordination in WP6. Plantics will be the overall responsible project leader and each WP has a project leader of one the partners.

Resultaat

The result will be:

- a fundamental understanding of the polymerization reactions of different GX formulations and the interactions with other materials.
- improved resin formulations and optimized use in specific applications. It will also support the development of future applications.
- three high impact GX binder applications, validated in an industrially relevant environment.
- optimized unit for producing GX resin in 50-100 kg/batch scale of different GX resins to support testing in an industrially relevant environment and to enable validation of production parameters
- validated design parameters to support the scale-up of GX resin process to full scale production
- updated Carbon footprint parameters
- dissemination of the results to interested companies

samenwerking met de Topsector Energie ontsloten.

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