

Novel bio-based material for the field of orthopedics

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Flexible composites with 100% bio-based carbon content

An epoxy resin system based on epoxidized linseed oil was developed which is mechanical flexible and biodegradable in compost (Figure 1). No solvents or catalysts were used to obtain an epoxy resin with a bio-based carbon content of 100 % and to avoid any hazardous substances. As reinforcement, knitted textiles were produced from bio-based fibers, which provide the required application-relevant structural properties of the composites.

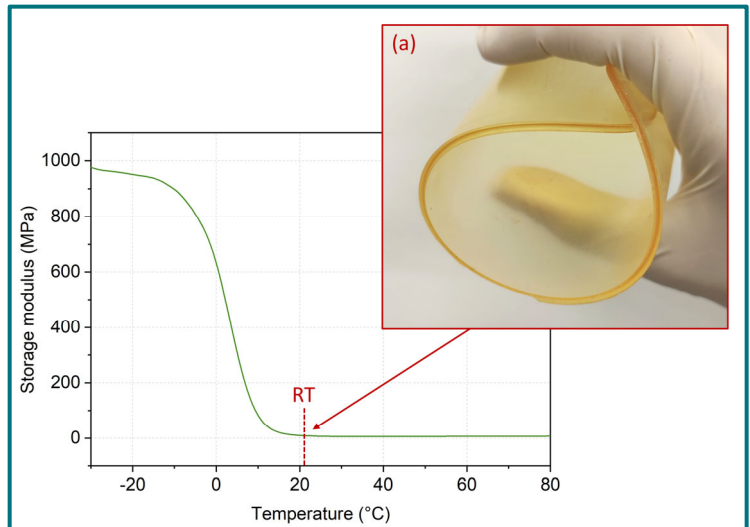


Fig.1

Storage modulus over temperature from dynamic mechanical analysis and the flexibility of the bio-based epoxy resin at room temperature (RT) in detail (a).



By developing respective processing technologies and preparation steps, composites with excellent bending properties and high tensile strength were produced. Compared to existing technical textiles, the composites are beneficial in terms of their technological and ecological properties. This provides opportunities for innovative products in a wide range of applications including furniture, sporting goods and technical leather. As part of the project, proof-of-concept demonstrations were carried out in the field of orthopedics (Figure 2).

Fig. 2

Bio-based prototype of wrist orthosis made of epoxy resin and knitted reinforcement.



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RESEARCH FOCUS: Thermosets based on renewable resources, smart composites, advanced thermal analysis

PROJECT: Semiflexible and flexible composites based on renewable resources

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