

SUPPORTING INFORMATION

**Recombinatorial approach for the formation of surface-functionalised
alkaline-stable lignin nanoparticles and adhesives**

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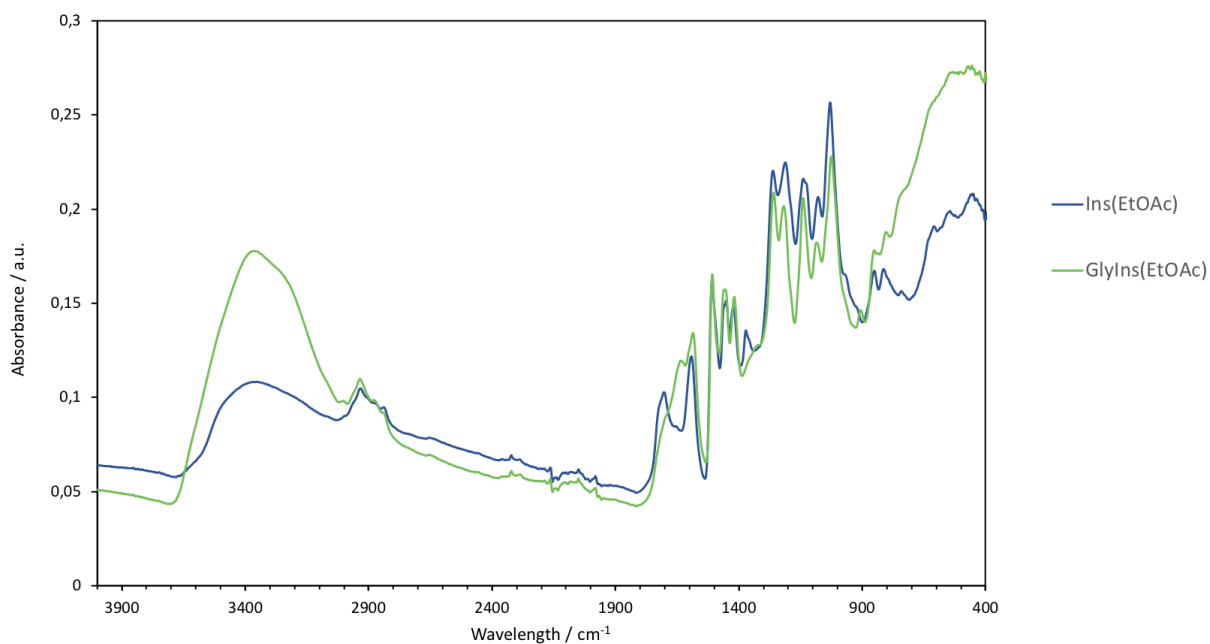


Figure S1. FT-IR/ATR spectrum of Ins_{EtOAc} and the corresponding glycidyl-derivative GlyIns_{EtOAc}.

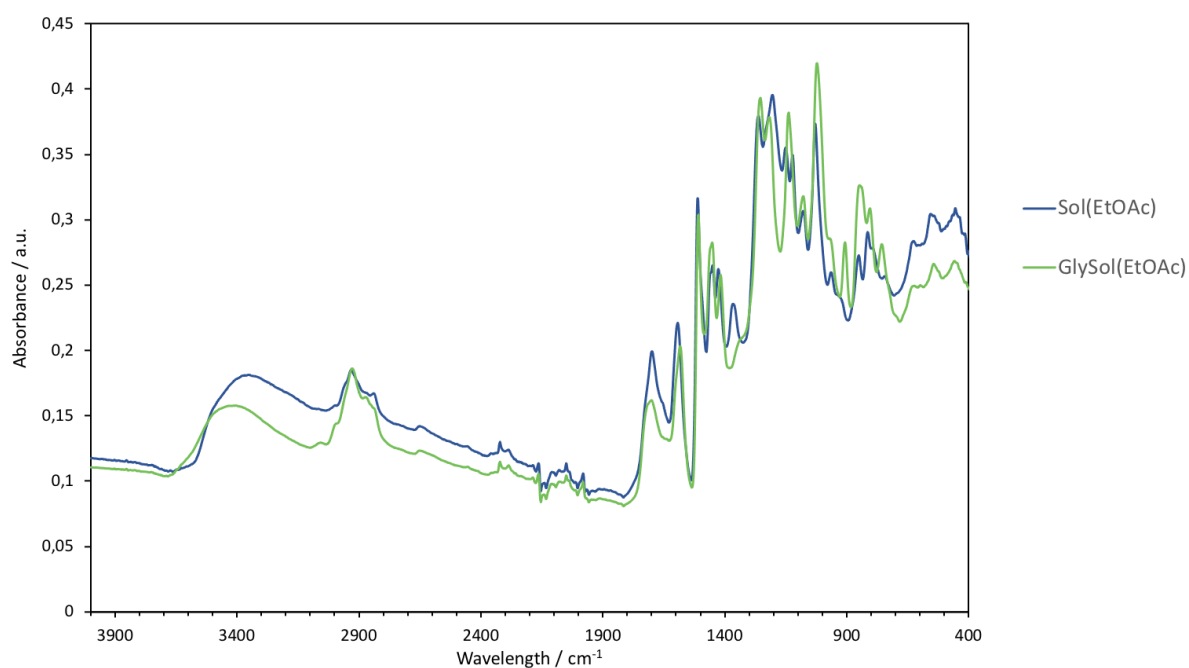


Figure S2. FT-IR/ATR spectrum of Sol_{EtOAc} and the corresponding glycidyl-derivative GlySol_{EtOAc}.

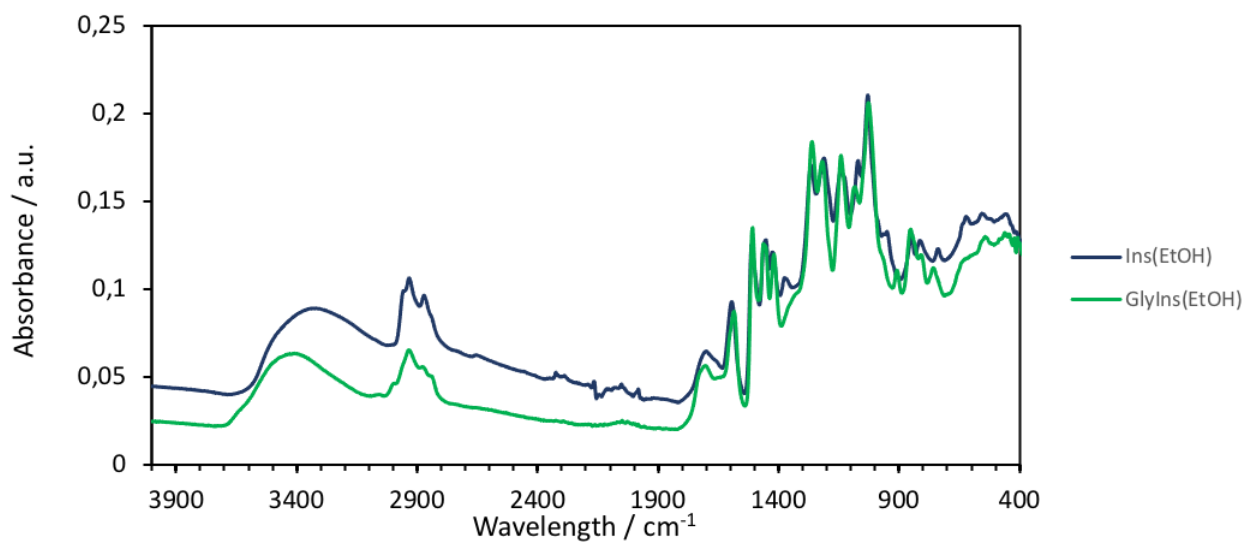


Figure S3. FT-IR/ATR spectrum of Ins_{EtOH} and the corresponding glycidyl-derivative $\text{GlyIns}_{\text{EtOH}}$.

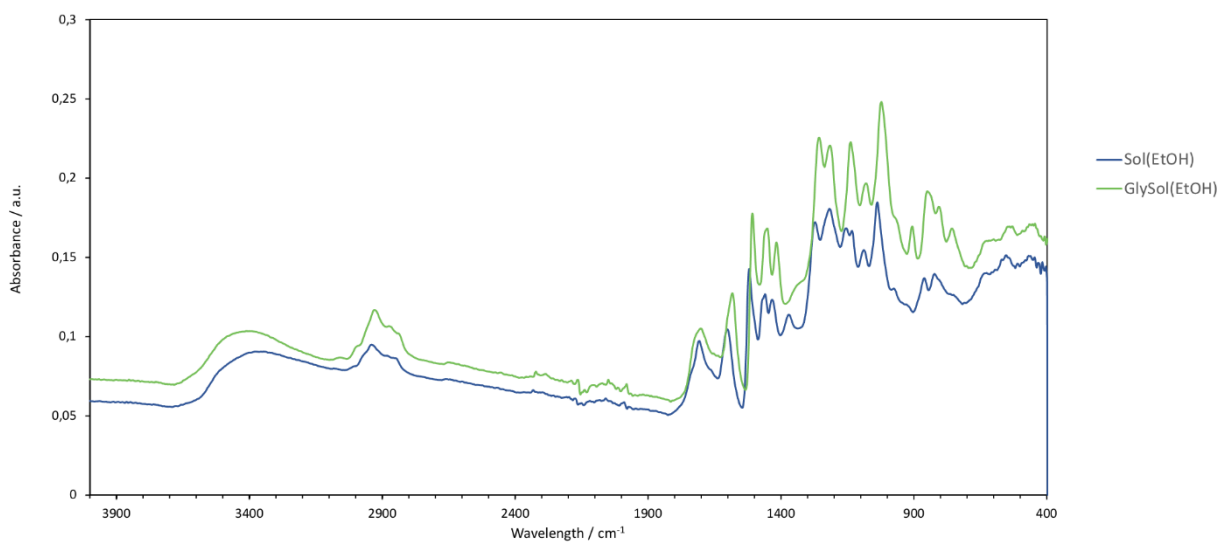


Figure S4. FT-IR/ATR spectrum of Sol_{EtOH} and the corresponding glycidyl-derivative $\text{GlySol}_{\text{EtOH}}$.

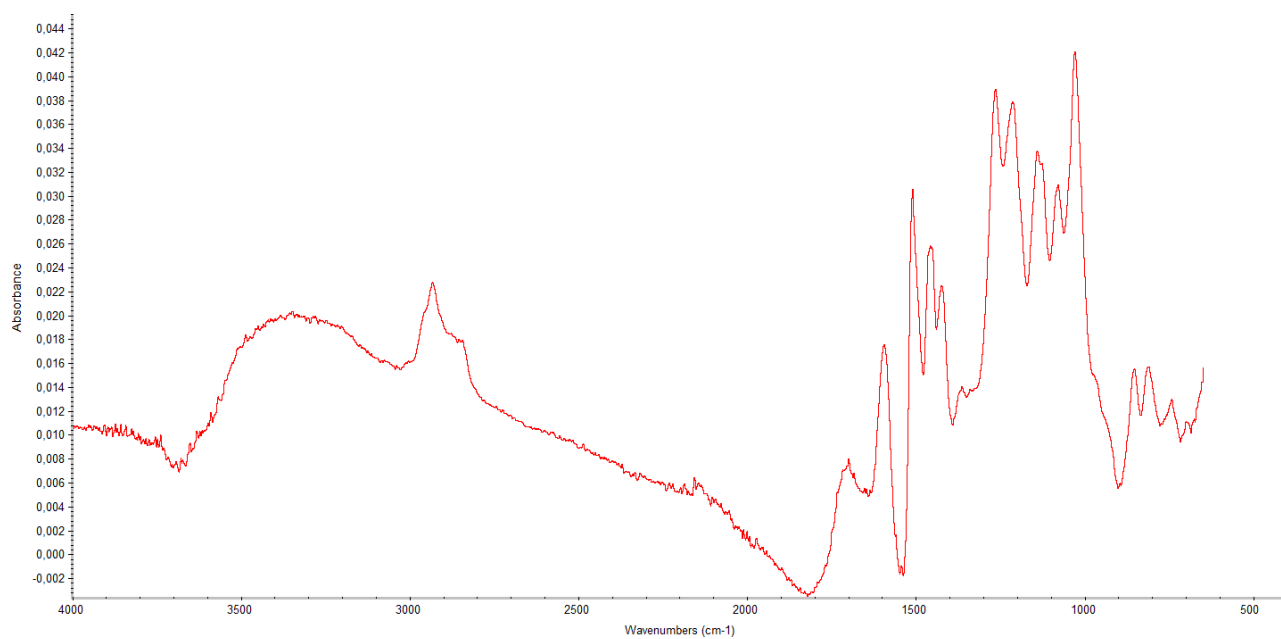


Figure S5. FT-IR/ATR spectrum of InSEtOH + GlySolEtOH LNPs after thermal treatment.

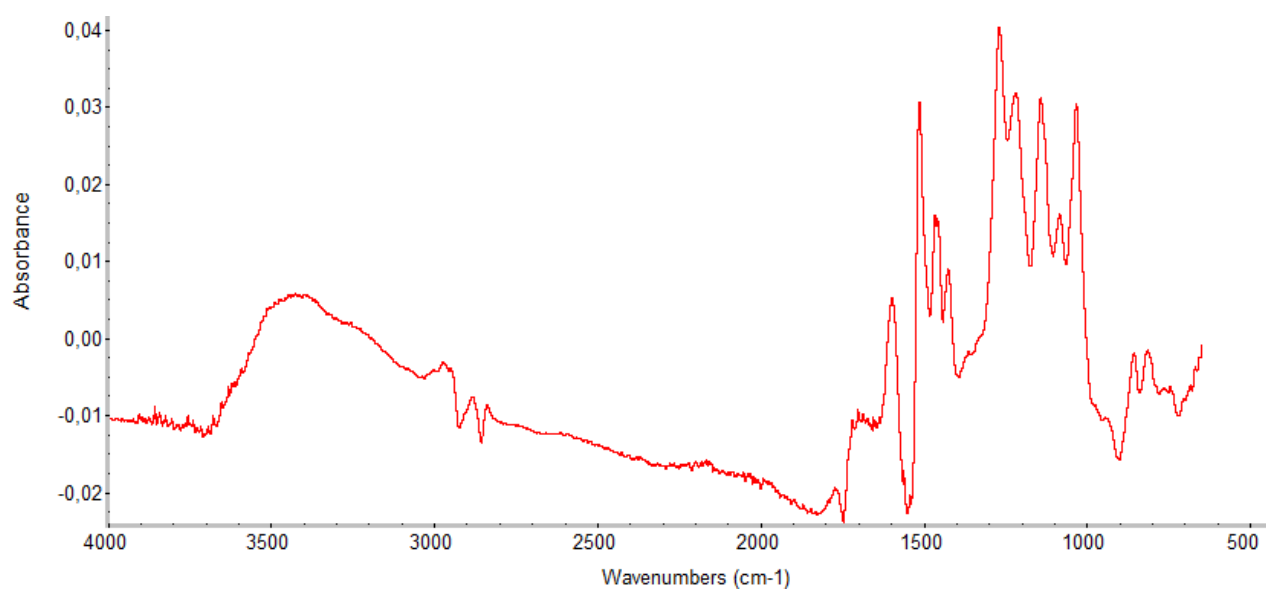


Figure S6. FT-IR/ATR spectrum of InSEtOAc + GlySolEtOAc LNPs after thermal treatment.

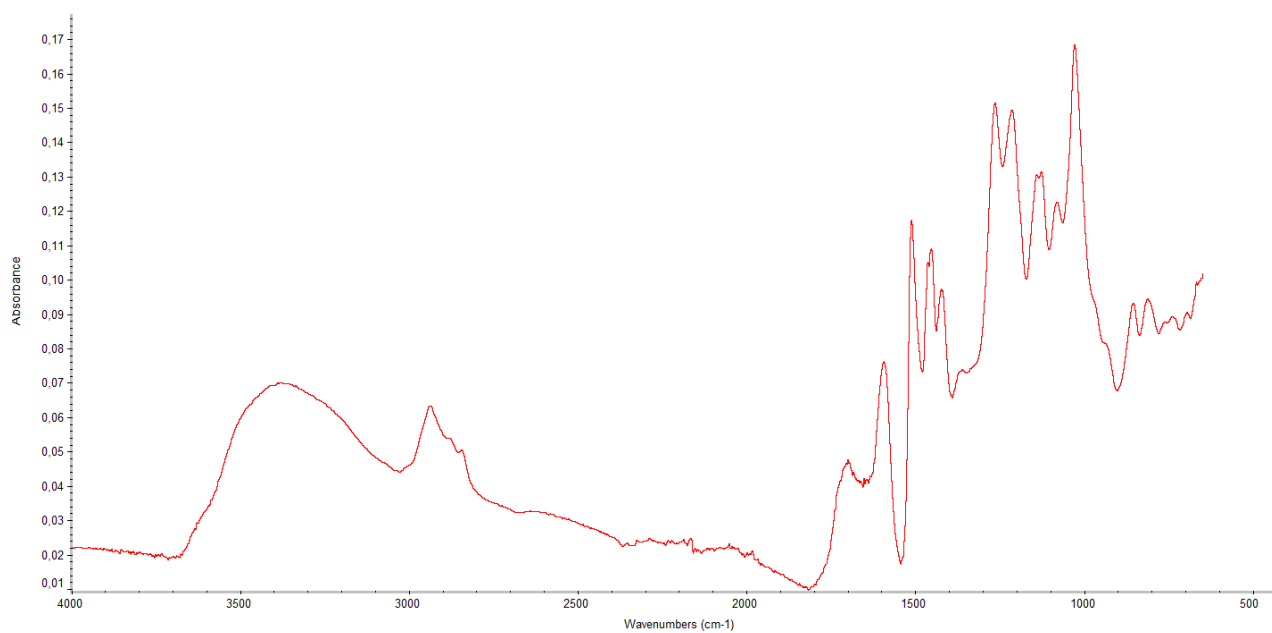


Figure S7. FT-IR/ATR spectrum of GlyIns_{EtOH} + Sol_{EtOH} LNPs after thermal treatment.

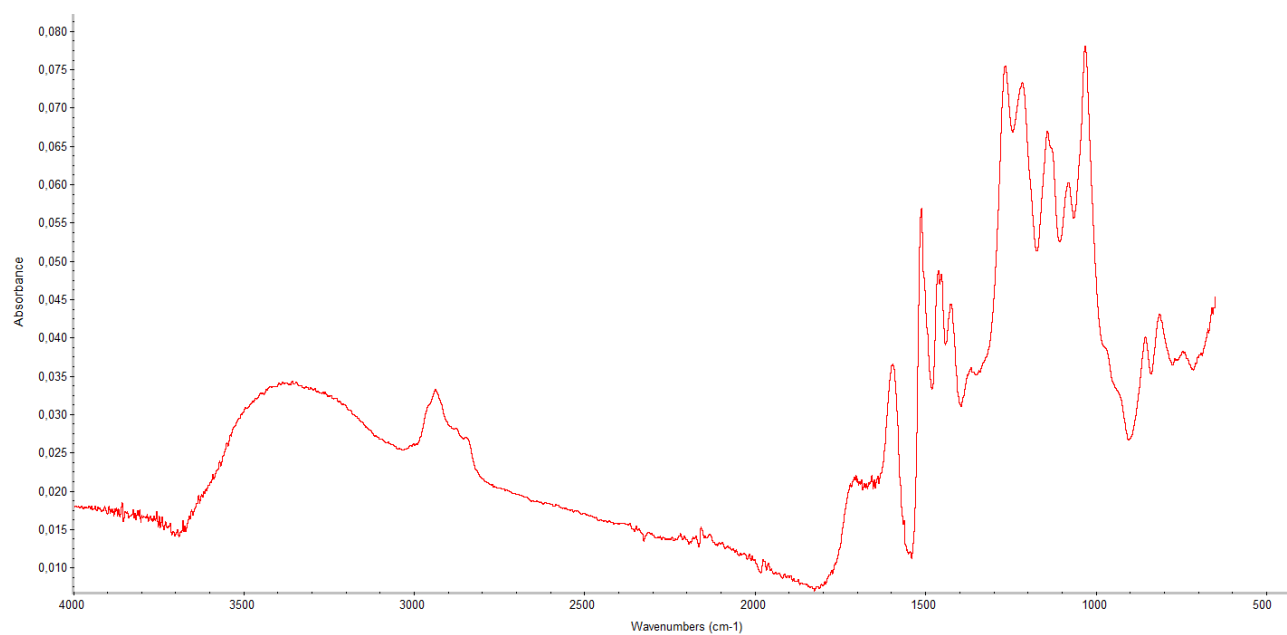


Figure S8. FT-IR/ATR spectrum of GlyIns_{EtOAc} + Sol_{EtOAc} LNPs after thermal treatment.



Figure S9. Experimental setup for shear mechanical tests. Glass joints were tightened by a grip and a load of increasing weight was added in the bucket.

Calculation of the weight fraction of the epoxy derivative

Molar mass of the epoxy derivative substituting hydrogen at a hydroxyl group of lignin: 57.07 g/mol

Epoxy content is 5 mmol/g based on ref. [1].

Weight percentage of epoxy in lignin = 28.5%

Weight fraction of ethyl acetate -soluble lignin = 36%

Weight percentage epoxy content of recombined LNPs based on the above = 10.3%

References:

[1] C. Gioia, M. Colonna, A. Tagami, L. Medina, O. Sevastyanova, L. A. Berglund, M. Lawoko, *Biomacromolecules* 2020, 21, 1920.