

Design of mediator-based deep eutectic solvent for targeted modulation of lignin structure for the lignin-enhanced multifunctional gels and fermentable sugar

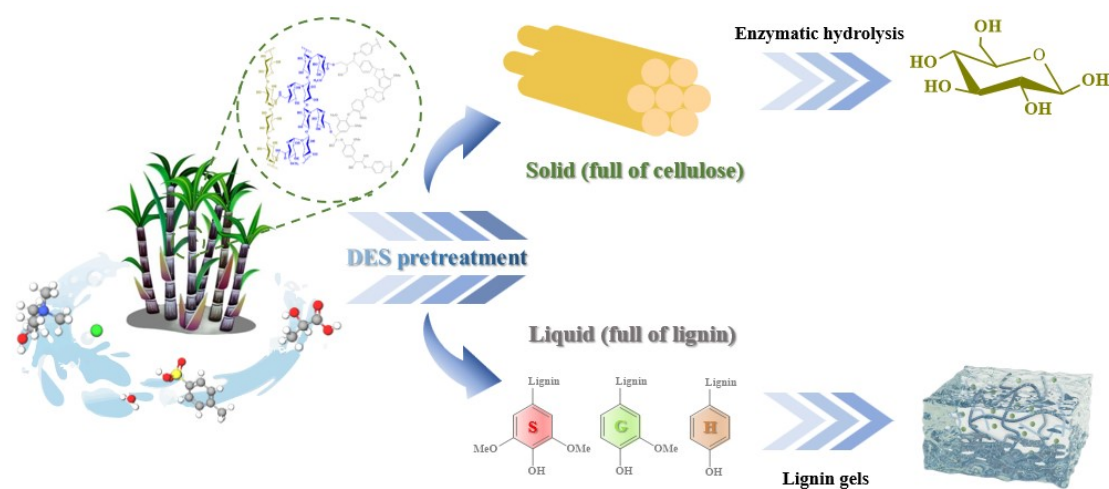


Fig. S1. The experimental procedure scheme.

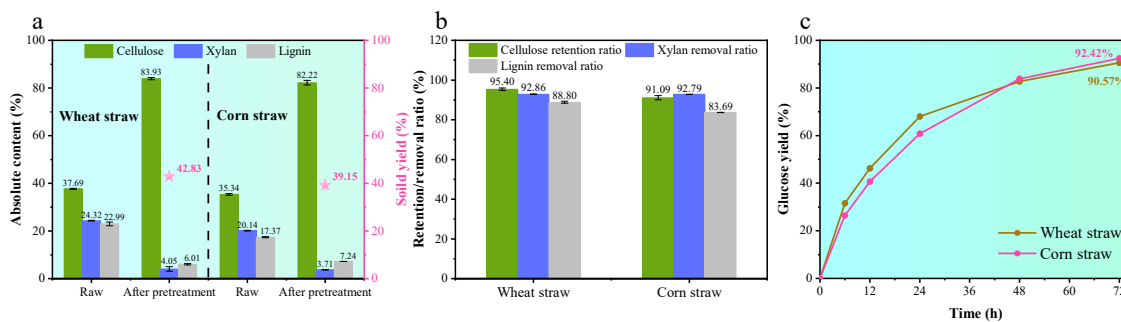


Fig. S2. The broad applicability of *p*-TsOH-mediated DES. (a) Chemical components.

(b) Retention or removal ratio. (c) Enzymatic hydrolysis efficiency.

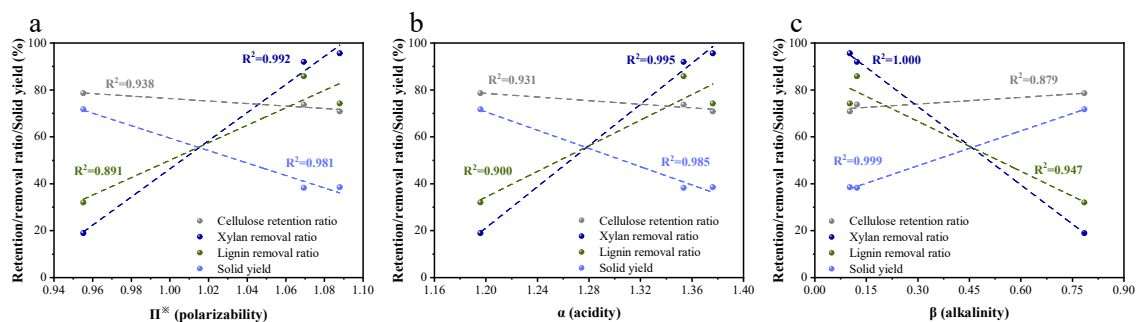


Fig. S3. The relationship between the K-T parameter of DES and the composition of residue (Cellulose retention ratio, xylan removal ratio, lignin removal ratio, solid yield).

(a) π^* . (b) α . (c) β .

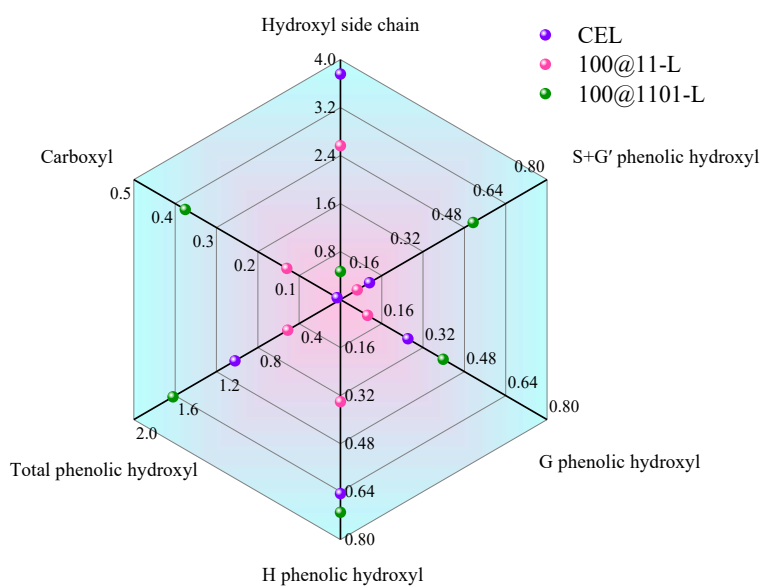


Fig. S4. ^{31}P NMR of regenerated lignin by *p*-TsOH-mediated DES.

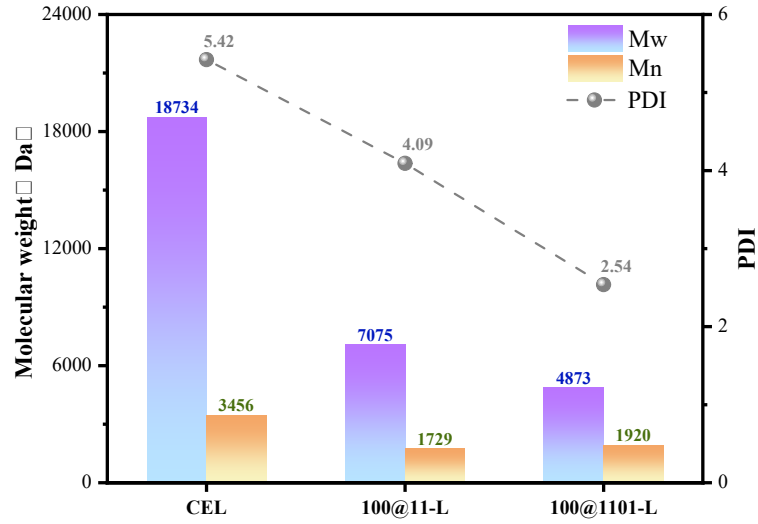


Fig. S5. GPC of regenerated lignin by *p*-TsOH-mediated DES.

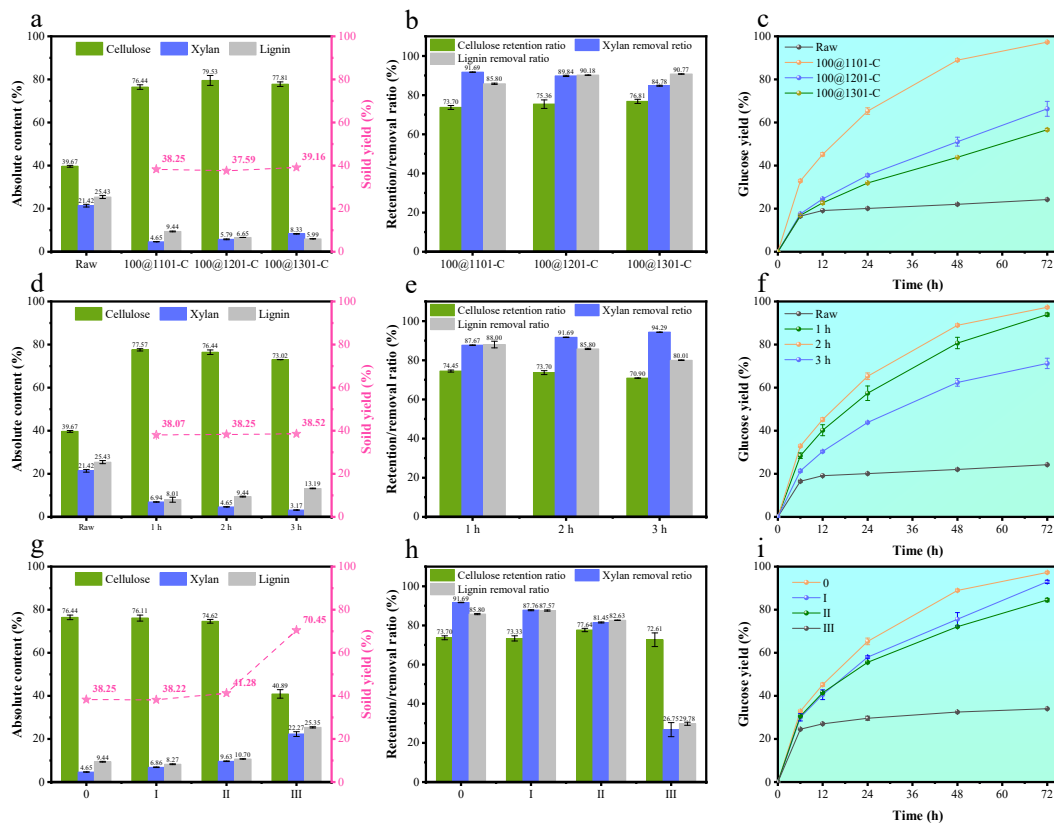


Fig. S6. Optimization of pretreatment parameters. (a-c) Different pretreatment molar ratios. (d-f) Different pretreatment time. (g-i) Different pretreatment cycle times.

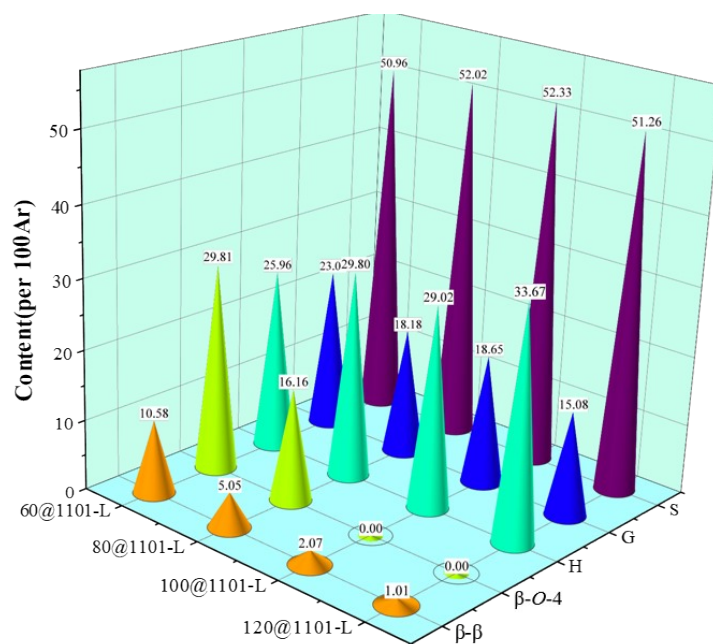


Fig. S7. 2D-HSQC NMR of regenerated lignin in different pretreatment temperature.

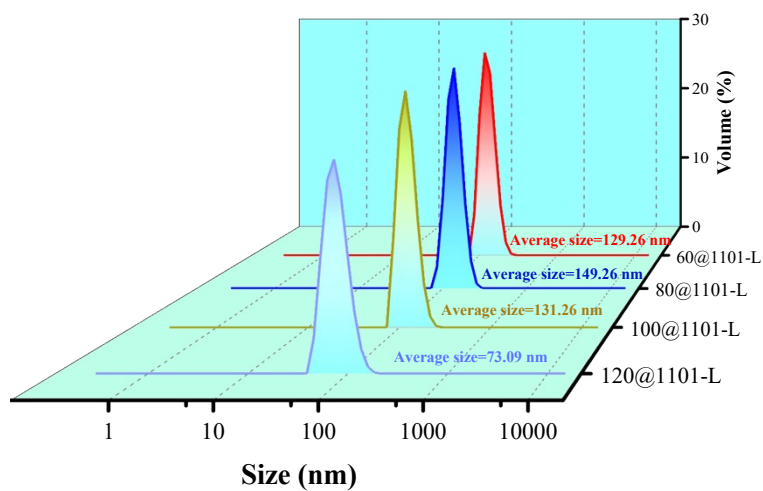


Fig. S8. The nanoparticle sizes of different regenerated lignin in DMSO.

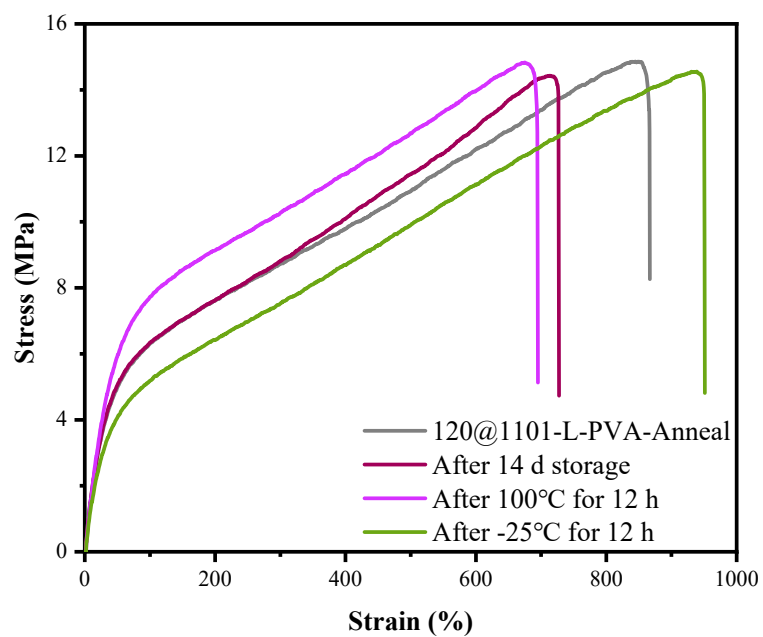


Fig. S9. Harsh environment testing of lignin gels.

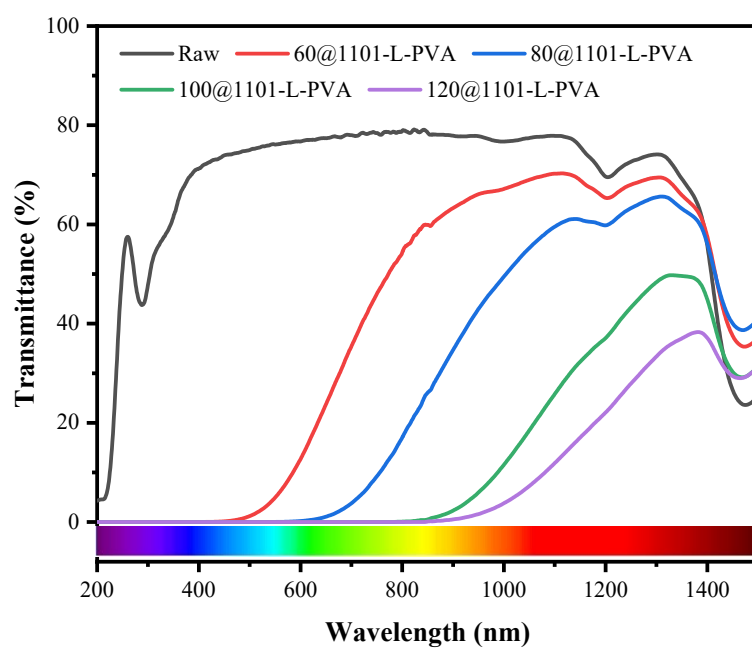


Fig. S10. Ultraviolet-visible-near infrared transmittance spectra of different lignin gels.