

Supporting information for

Sustainable strong performance of Lignin Strengthened adhesive formulation with novel deep eutectic solvent

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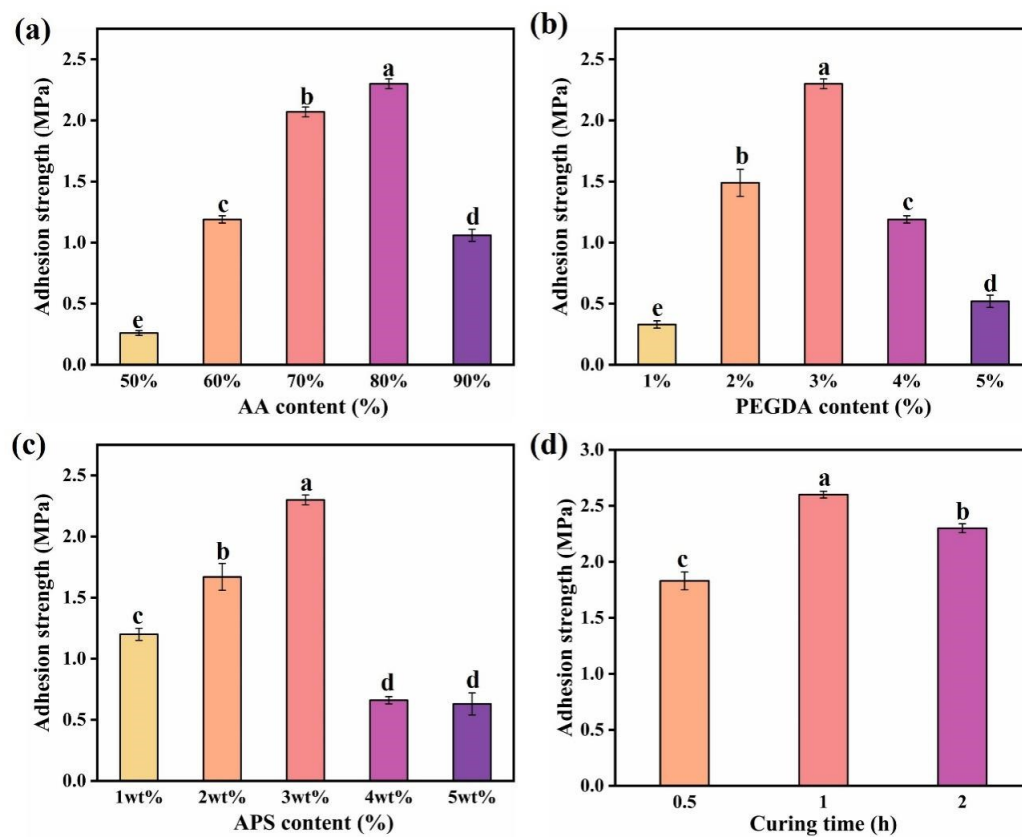


Figure S1. Synthesis conditions optimization for adhesives_{with PEGDA}. (a) AA content.

(b) PEGDA content. (c) APS content. (d) Curing time

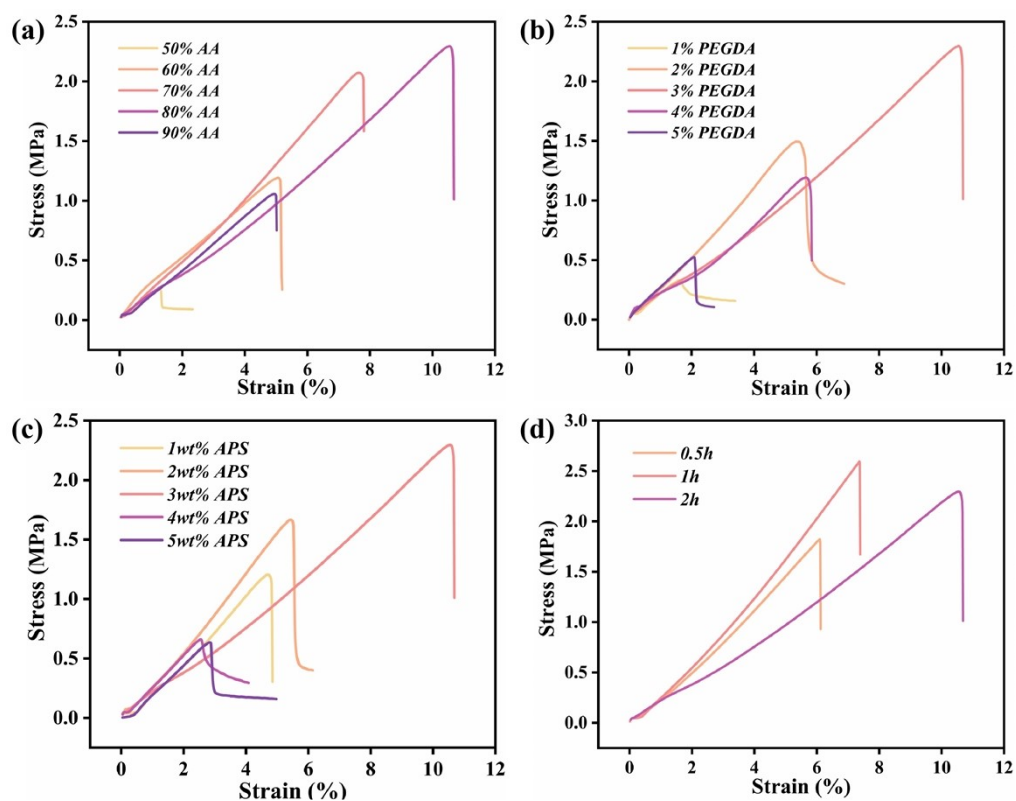


Figure S2. Stress-strain images of the optimal synthesis conditions of the adhesives_{with} PEGDA for single-factor analysis. (a) AA content. (b) PEGDA content. (c) APS content. (d) Curing time

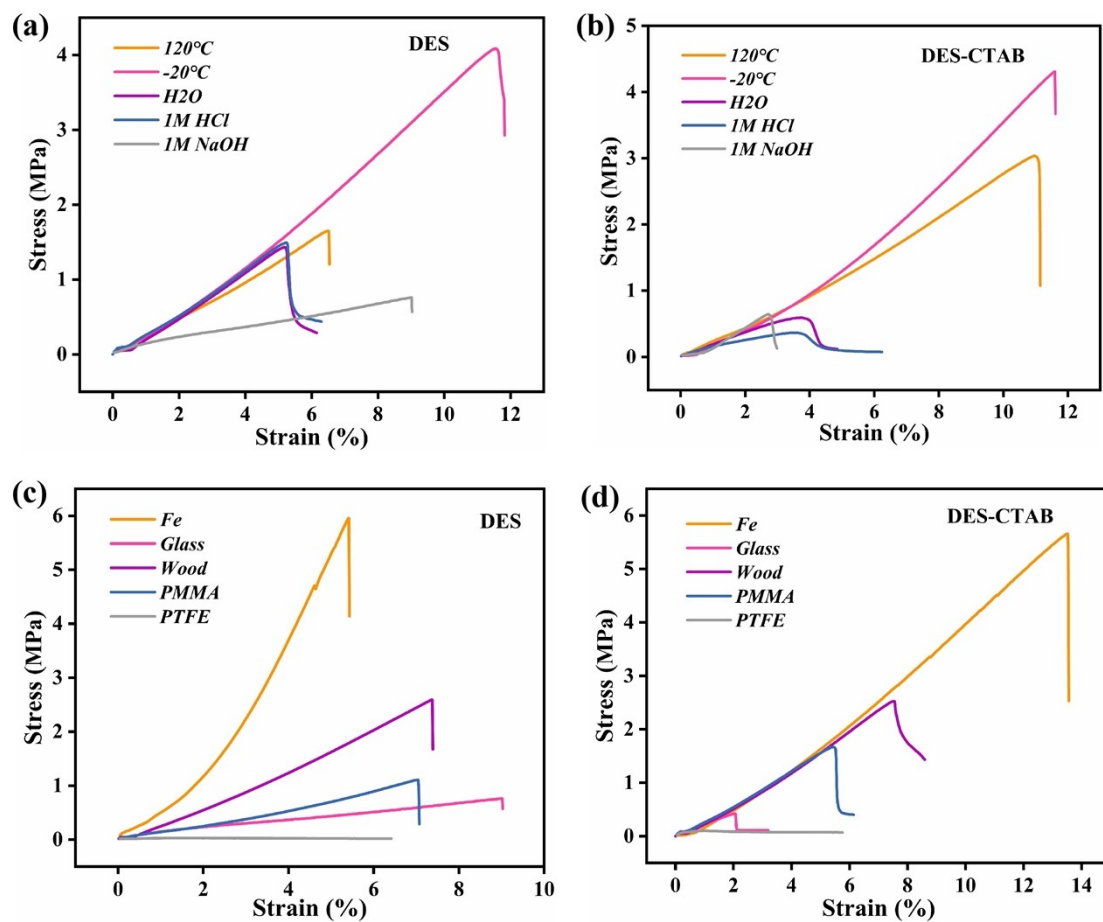


Figure S3. Temperature adaptability and solvent tolerance of different adhesives_{with} PEGDA: (a) The stress-strain curve of DES (b) The stress-strain curve of DES-CTAB Adhesion of different adhesives applied to different plates: (c) The stress-strain curve of DES (d) The stress-strain curve of DES-CTAB

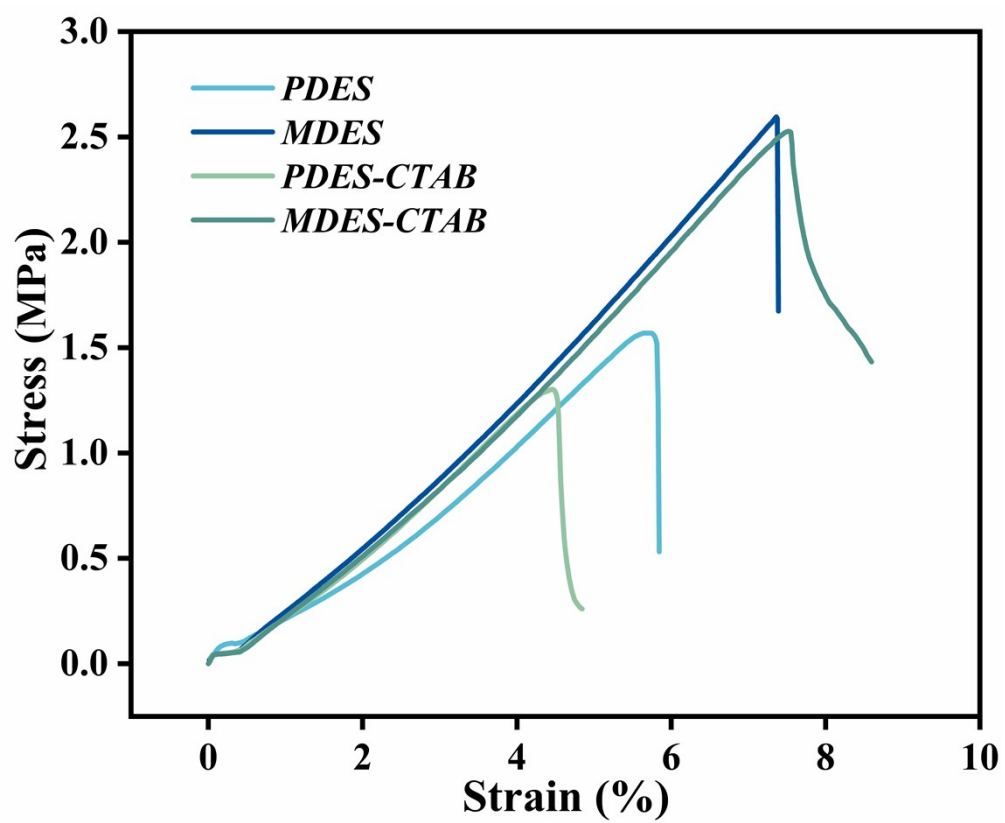


Figure S4.Effects of different solvents on the adhesion properties of different adhesives_{with PEGDA}:Stress-strain curves

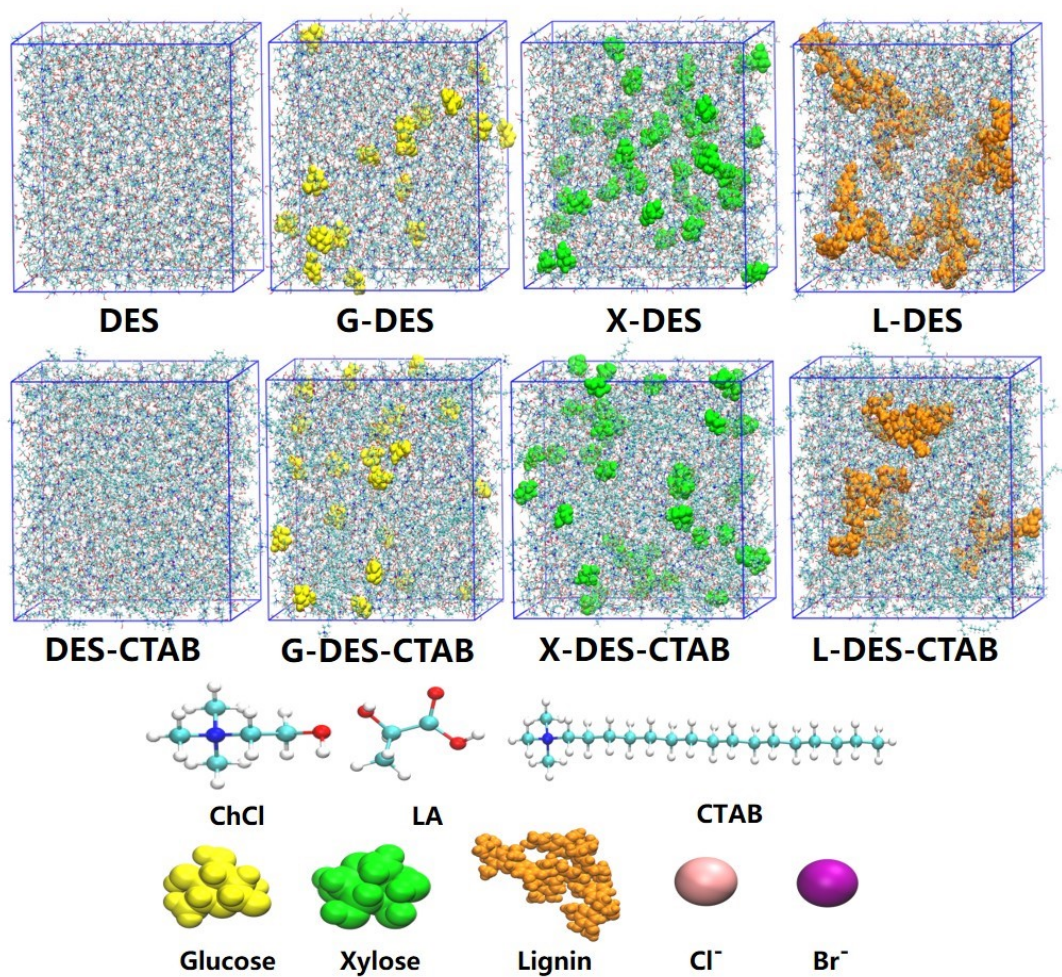


Figure S5. Different simulation systems and their molecular microstructures

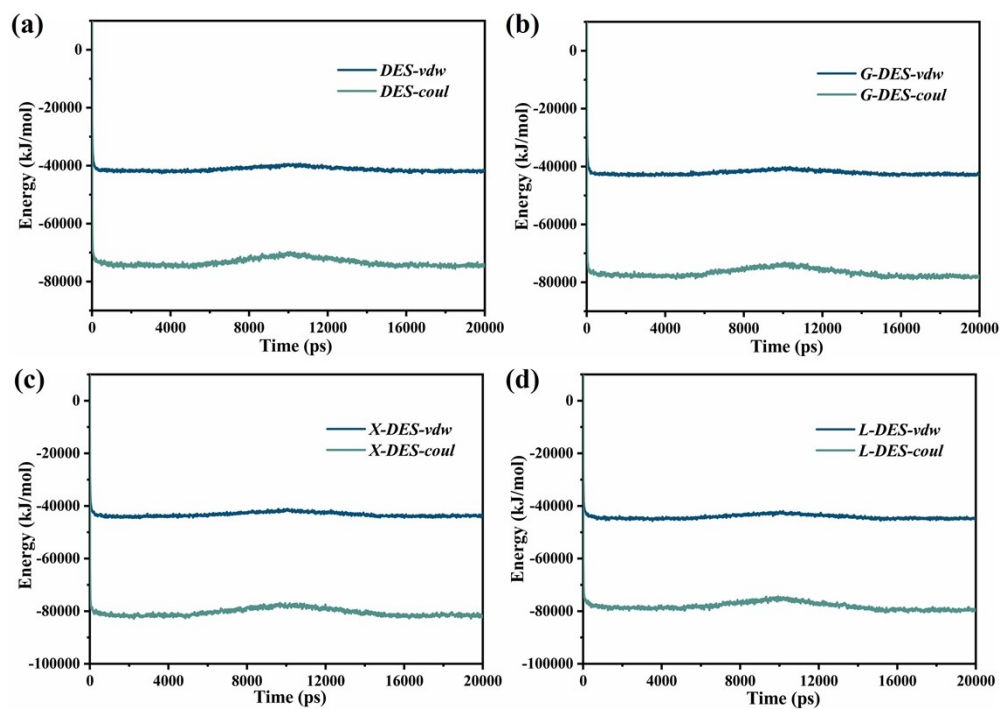


Figure S6. The overall intermolecular interaction energy of different DES solvent systems: (a) System DES; (b) System G-DES; (c) System X-DES; (d) System L-DES; where vdw represents van der Waals interaction and coul represents electrostatic interaction

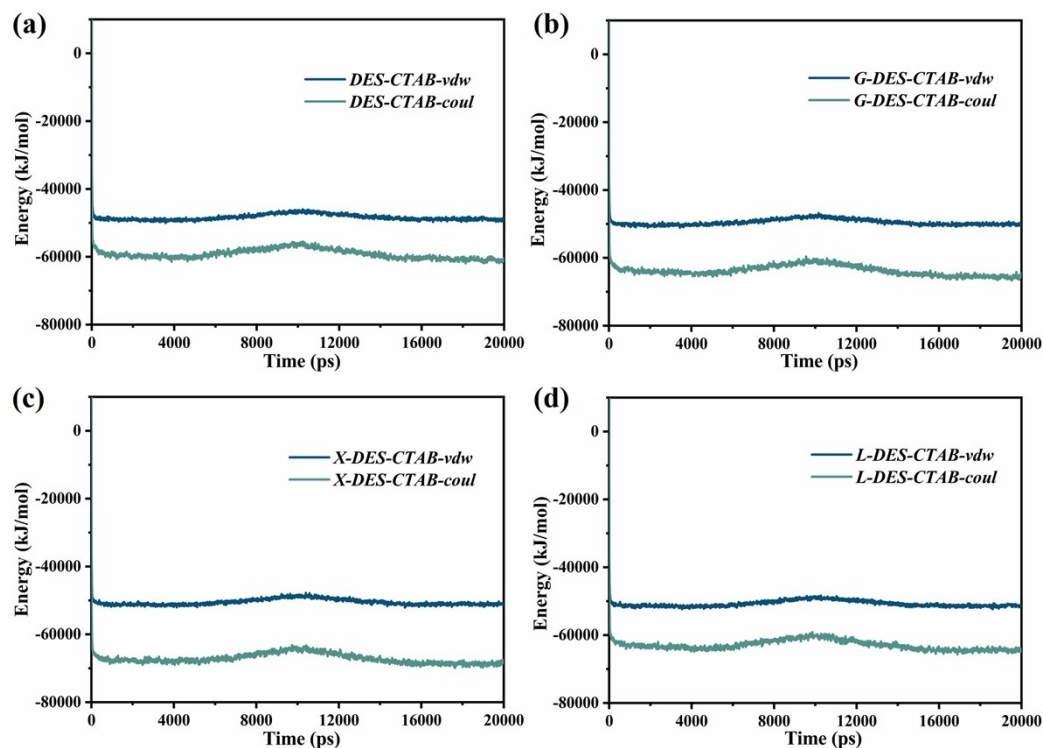


Figure S7. The overall intermolecular interaction energy of different DES-CTAB solvent systems: (a) DES-CTAB; (b) System G-DES-CTAB; (c) System X-DES-CTAB; (d) System L-DES-CTAB; where vdw represents van der Waals interaction and coul represents electrostatic interaction

Table S1. Molecular dynamics simulation components of different systems

Types	LA	ChCl	CTAB	Additives		
				Glucose	Xylose	Lignin
DES	1000	500	-	-	-	-
G-DES	1000	500	-	17	-	-
X-DES	1000	500	-	-	43	-
L-DES	1000	500	-	-	-	6
DES-CTAB	1000	500	83	-	-	-
G-DES-CTAB	1000	500	83	23	-	-
X-DES-CTAB	1000	500	83	-	47	-
L-DES-CTAB	1000	500	83	-	-	5