

Electronic supplementary information

Hemiaminal Dynamic Covalent Networks with Rapid Stress Relaxation, Reprocessability and Degradability Endowed by the Synergy of Disulfide and Hemiaminal Bonds

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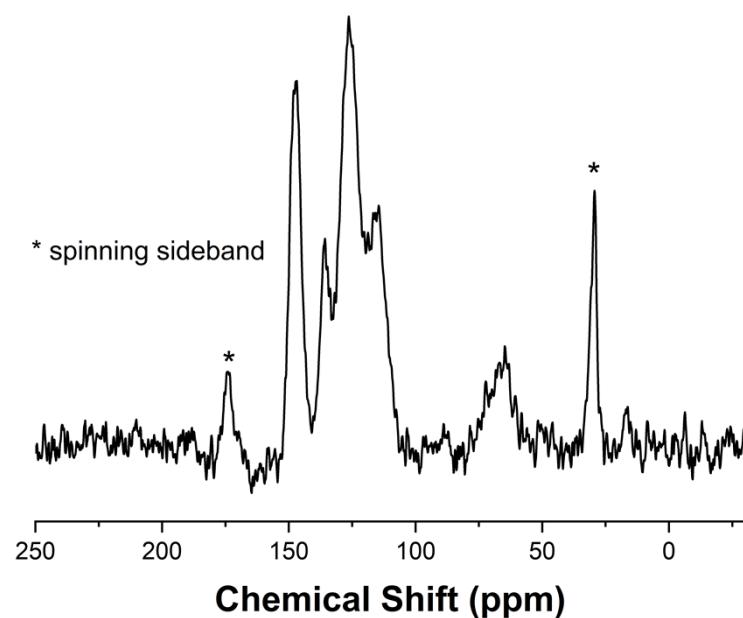


Fig. S1 Solid state ^{13}C NMR spectrum of HDCN-DTDA.

Table S1 A comparison of reprocessing temperatures, reprocessing times and degradation conditions between HDCNs-DTDA and reported vitrimers containing single disulfide or hemiaminal bonds

Polymer type	Dynamic bond	Reprocessing temperature (°C)	Reprocessing time (min)	Degraded condition	Ref.
HDCNs	Hemiaminal bond	140	30	Amine solution	1
HDCNs	Hemiaminal bond	-	-	Sulfuric acid solution	2
HDCNs	Hemiaminal bond	-	-	Sulfuric acid solution	3
HDCNs	Hemiaminal bond	-	-	Hydrochloric acid solution	4
Epoxy resin	Disulfide bond	155	120	Tributylphosphine solvent	5
Epoxy resin	Disulfide bond	180	60	Thiol solution	6
HDCNs	Hemiaminal and disulfide bonds	130	10	Thiol solution and hydrochloric acid solution	This work

References

1. H. Lei, S. Wang, D. J. Liaw, Y. Cheng, X. Yang, J. Tan, X. Chen, J. Gu and Y. Zhang, *ACS Macro Letters*, 2019, **8**, 582-587.
2. J. M. García, G. O. Jones, K. Virwani, B. D. McCloskey, D. J. Boddy, G. M. ter Heurne, H. W. Horn, D. J. Coady, A. M. Bintaleb, A. M. S. Alabdulrahman, F. Alsewailem, H. A. A. Almegren and J. L. Hedrick, *Science*, 2014, **344**, 732-735.
3. Z. Li, J. Qiu and C. Pei, *Cellulose*, 2016, **23**, 2449-2455.
4. Z. Xing, X. Jia, X. Li, J. Yang, S. Wang, Y. Li, D. Shao, L. Feng and H. Song, *ACS Applied Materials & Interfaces*, 2023, **15**, 11053-11061.
5. X. Qi, J. Zhang, L. Zhang and D. Yue, *Journal of Materials Chemistry A*, 2021, DOI: 10.1039/D1TA06299A.
6. H. Si, L. Zhou, Y. Wu, L. Song, M. Kang, X. Zhao and M. Chen, *Composites Part B: Engineering*, 2020, **199**, 108278.