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Supporting Information

Self-healing and reprocessing of reclaimed rubber prepared by re-crosslinking waste natural rubber powders

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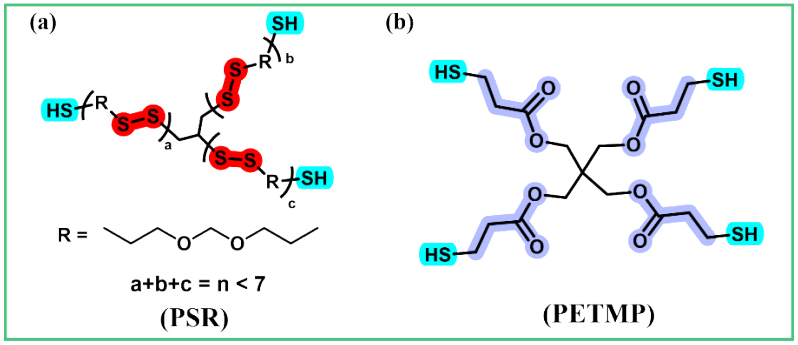
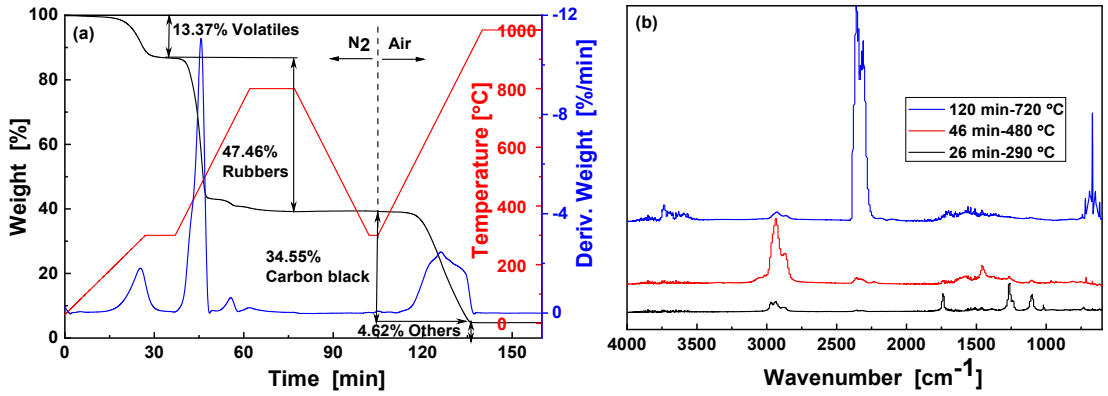


Figure. S1 Chemical structure of PSR and PETMP.



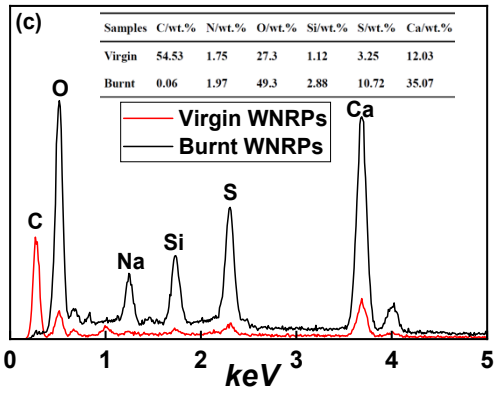


Figure. S2 TG-IR analysis of WNRPs, (a) TGA curves and (b) IR spectra of decompositions detected at different temperatures. (c) EDS curves of residual compositions of thermally decomposed and virgin WNRPs.

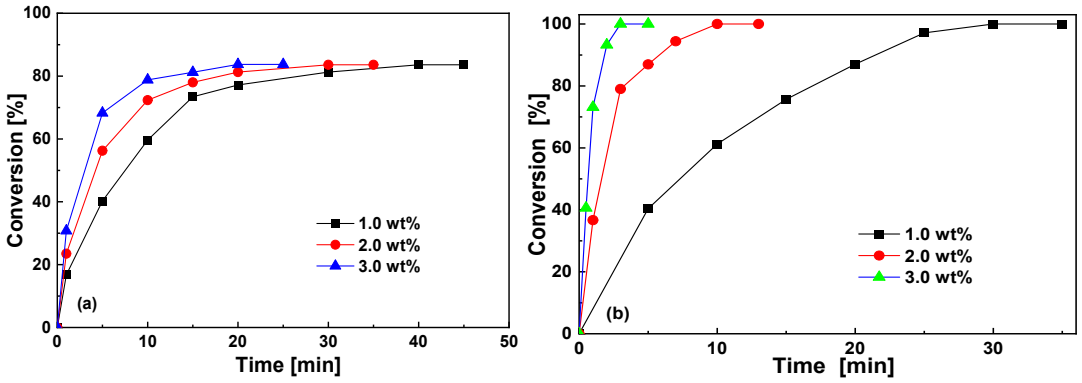


Figure. S3 Double bond conversions for (a) WNRPs10/PSR2 and (b) WNRPs10/PSR4 varied with catalyst dosages at 100 °C.

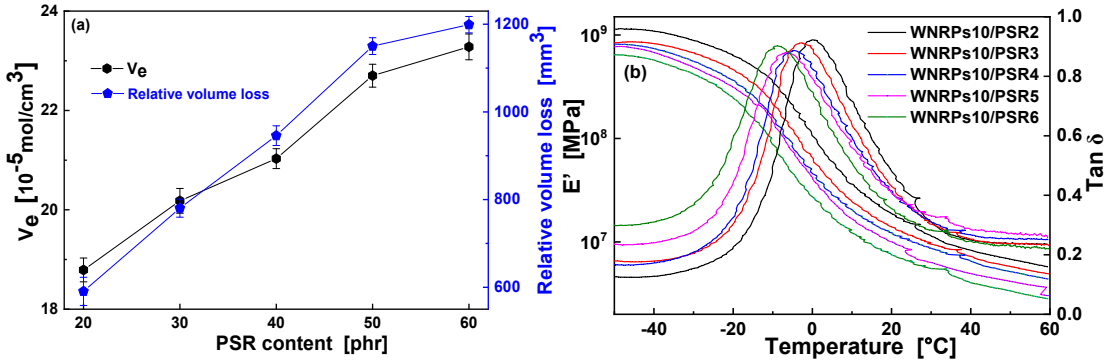


Figure. S4 (a) Crosslinking density and volume loss, and (b) DMA curves of different reclaimed rubbers.

Table S1 Maximum loss factor, effective damping temperature range and glass transition temperature of various reclaimed rubbers.

Samples	$Tan\delta_{max}$	Damped temperature range (°C)	T_g (°C)
WNRPs10/PSR2	0.92	-15.5～30.5	0.1
WNRPs10/PSR3	0.91	-19.4～29.4	-3.0
WNRPs10/PSR4	0.89	-21.0～30.2	-4.6
WNRPs10/PSR5	0.88	-26.9～34.8	-6.9
WNRPs10/PSR6	0.90	-39.3～25.5	-8.5

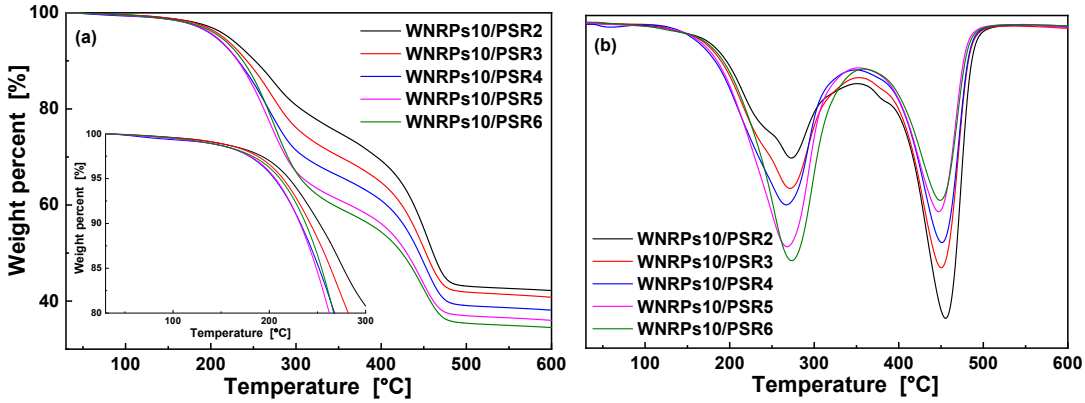
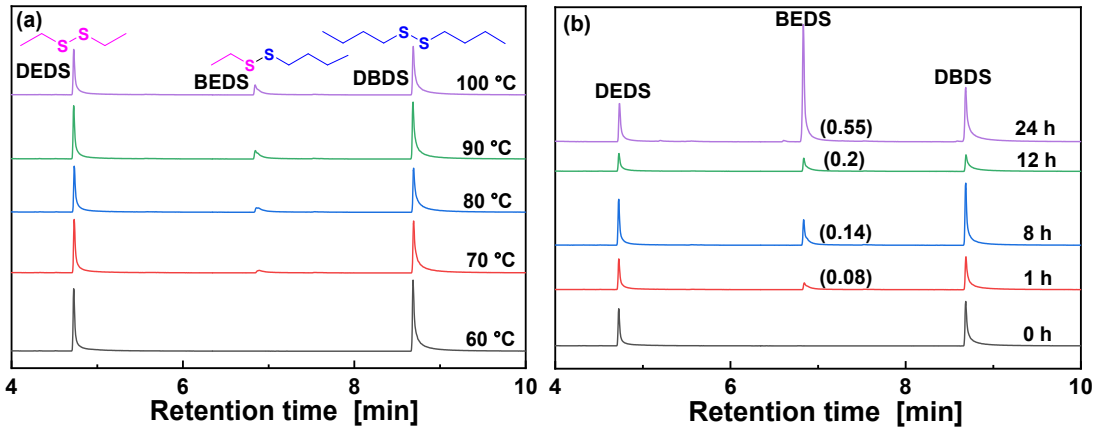


Figure. S5 (a) TGA and (b) DTG curves of various reclaimed rubbers.



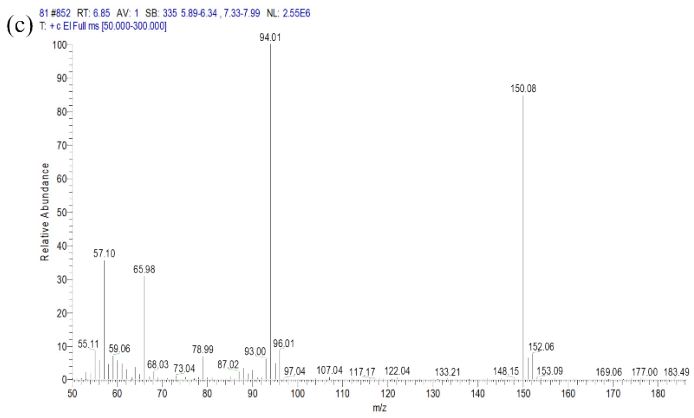


Figure. S6 GC chromatograms of the mixture containing equimolar DEDS and DBDS recorded (a) under different reaction temperature for 1 h, and (b) at 100 ºC for different reaction time, (DBU dosage: 3 mol%). (c) Mass spectrum of metathesis product.

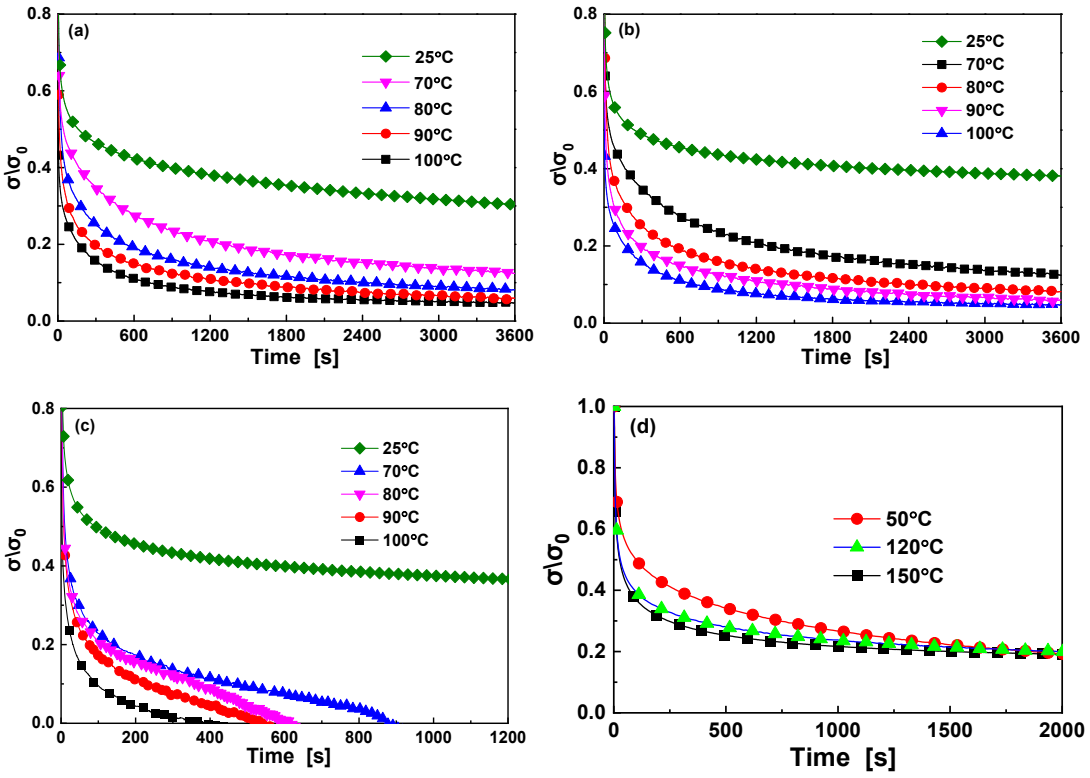


Figure. S7 Stress relaxation curves of (a) WNRPs10/PSR2, (b) WNRPs10/PSR3, (c) WNRPs10/PSR5, and (d) WNRPs10/PETMP4 measured at different temperatures.

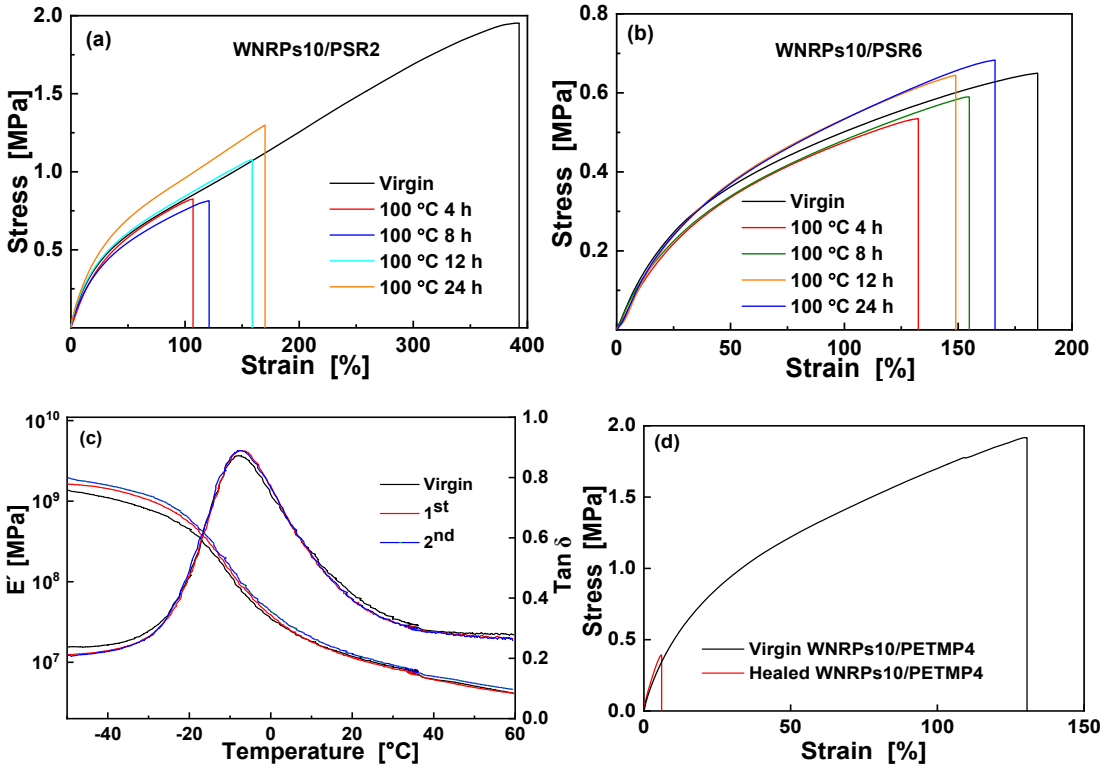


Figure. S8 Stress-strain curves of virgin and healed reclaimed rubbers, (a) WNRPs10/PSR2 and (b) WNRPs10/PSR6 healed at 100 °C for different time. (c) DMA curves of virgin and repeatedly healed WNRPs10/PSR4. (d) Stress-strain curves of virgin and healed control samples WNRPs10/PETMP4.

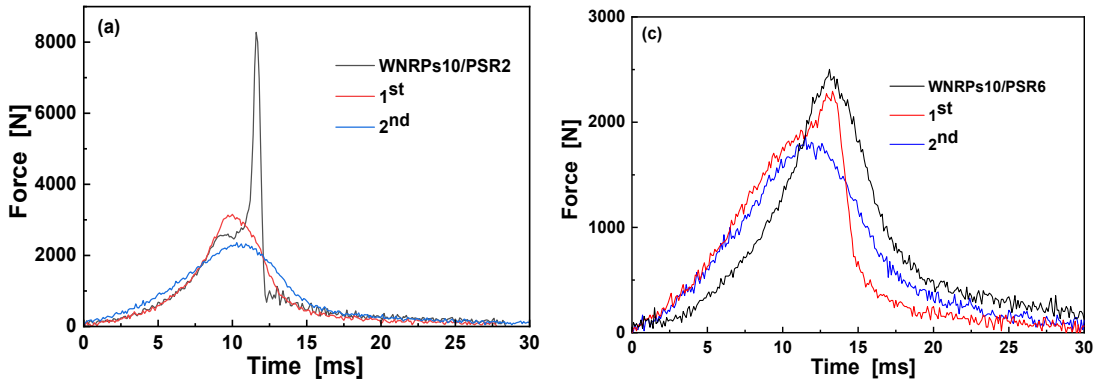


Figure. S9 Drop impact force curves of virgin and self-healed reclaimed rubbers, (a) WNRPs10/PSR2, and (b) WNRPs10/PSR6.

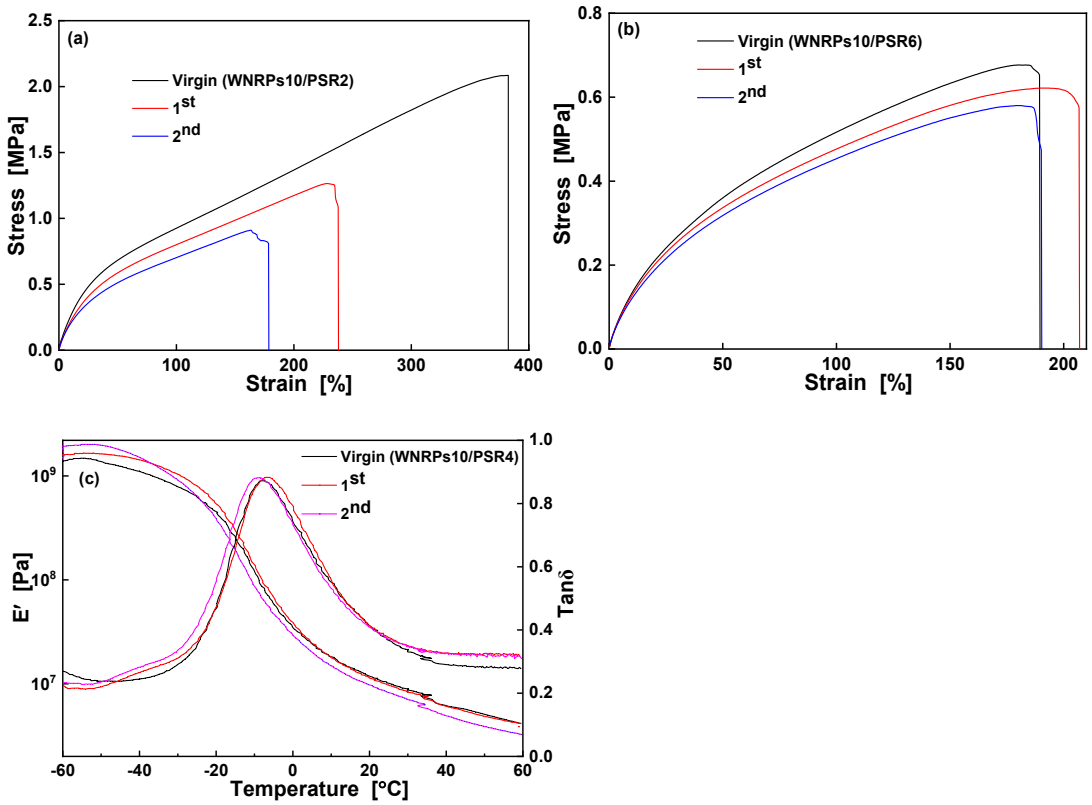


Figure. S10 Stress-strain curves of virgin and reprocessed reclaimed rubbers, (a) WNRPs10/PSR2 and (b) WNRPs10/PSR6, repeatedly reprocessed at 100 °C for 12 h. (c) DMA curves of virgin and reprocessed reclaimed rubber WNRPs10/PSR4.