

Revealing the thermal sensitivity of lignin during glycerol thermal processing through structural analysis

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Supporting information

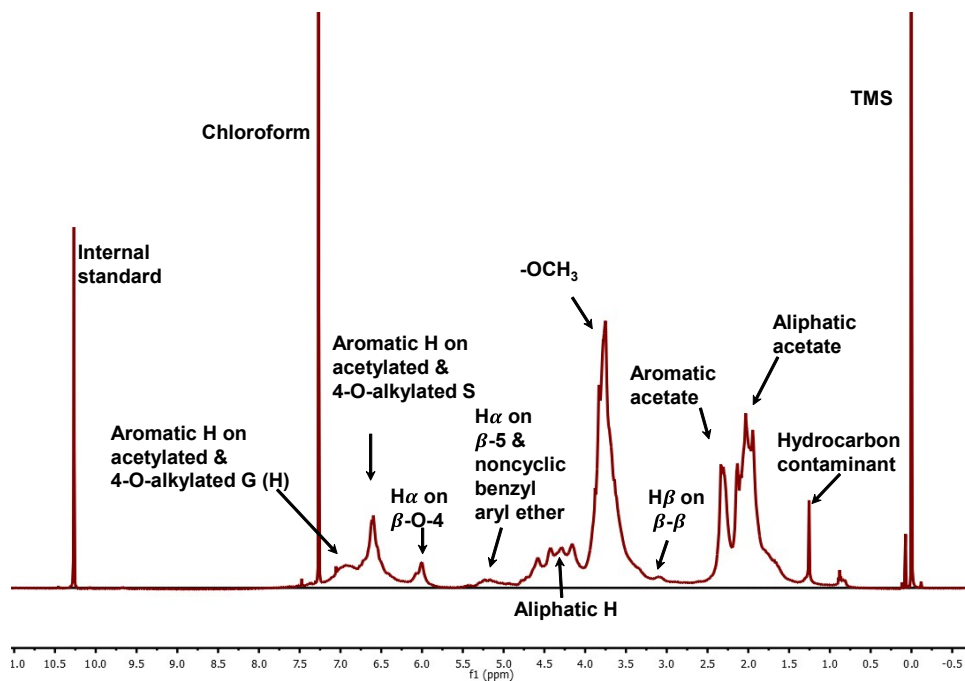


Figure S1. Quantitative ¹H-NMR spectra of GTP lignin with peak assignments.

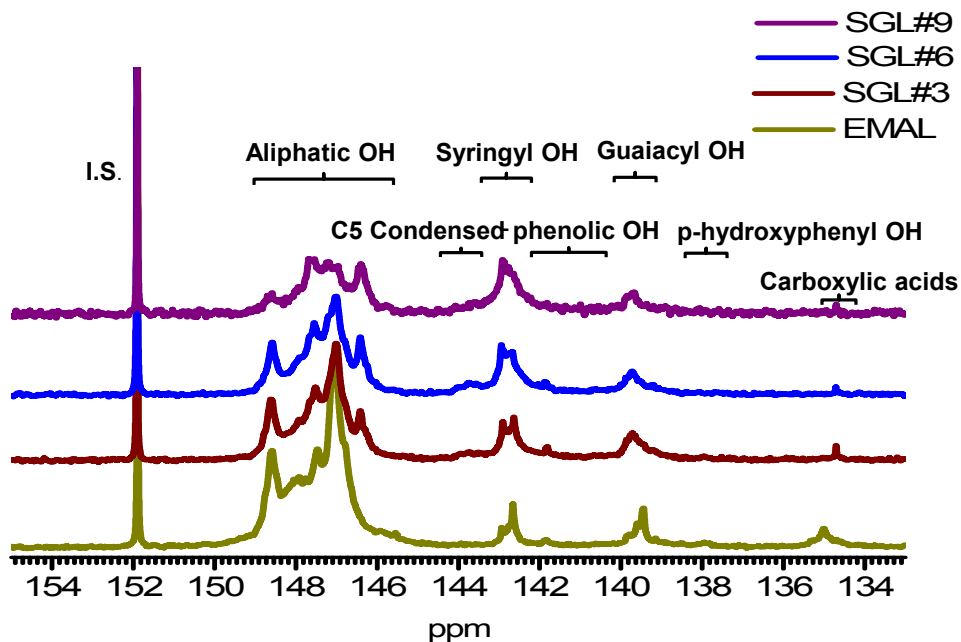


Figure S2. Quantitative ³¹P-NMR spectra with peak assignments of EMAL and GTP lignin as a function of $\log(R_0)$.

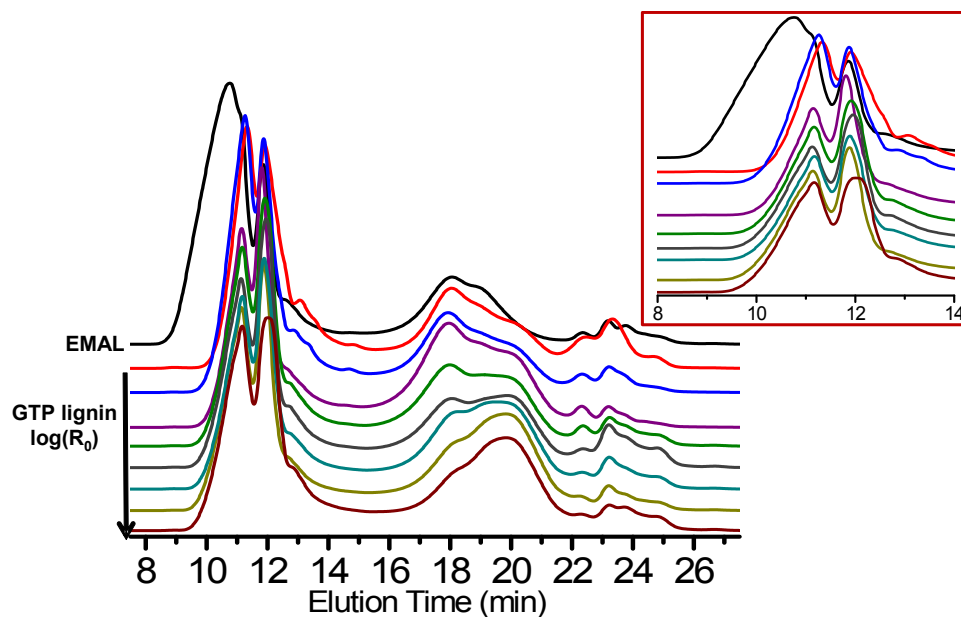


Figure S3. SEC elution curves of EMAL and GTP lignin as a function of $\log(R_0)$ (UV detector at a wavelength of 290 nm).

Table S1. C9 formula of EMAL and GTP lignin.

$\log(R_0)$	Molecular Formula of C9	MW of C9 (g/mol)
EMAL	$C_9H_{7.63}O_{3.03}(OCH_3)_{1.87}$	222.1
4.14	$C_9H_{7.04}O_{2.40}(OCH_3)_{1.85}$	210.7
4.44	$C_9H_{6.79}O_{2.41}(OCH_3)_{1.85}$	210.7
4.61	$C_9H_{6.66}O_{2.27}(OCH_3)_{1.82}$	207.6
4.72	$C_9H_{6.51}O_{2.30}(OCH_3)_{1.76}$	205.8
5.03	$C_9H_{6.48}O_{2.15}(OCH_3)_{1.74}$	203.0
5.2	$C_9H_{6.51}O_{2.11}(OCH_3)_{1.74}$	202.2

*Molecular formula and molecular weights of C9 were determined using the average of duplicates from results of elemental analysis (COV<0.2%) and 1H -NMR (COV<10%). Protein content <2% (w%) for GTP isolated lignin, and 5.7% (w%) for EMAL, ignored in the formula.

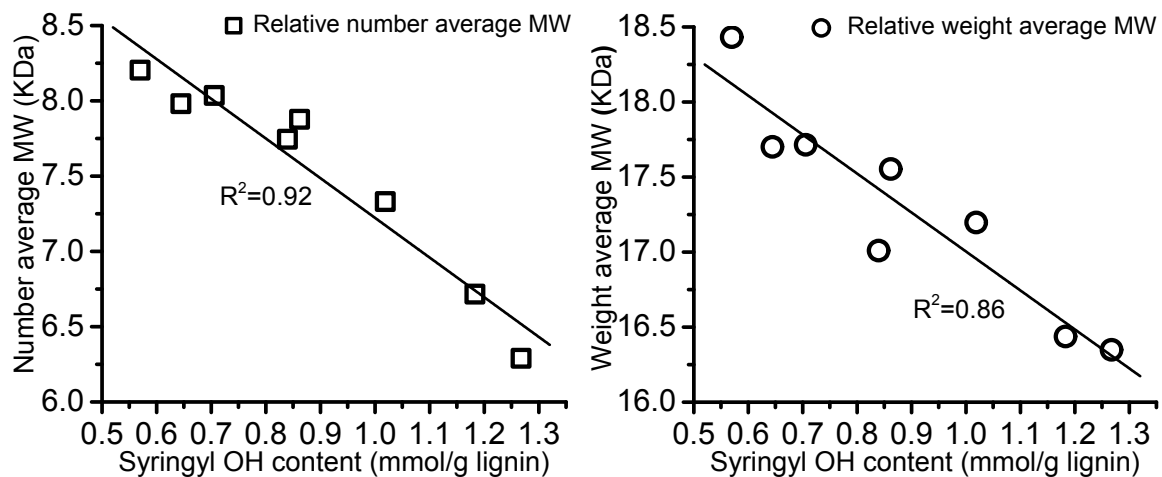


Figure S4. Correlations between molecular weight characteristics and free syringyl hydroxyl groups.

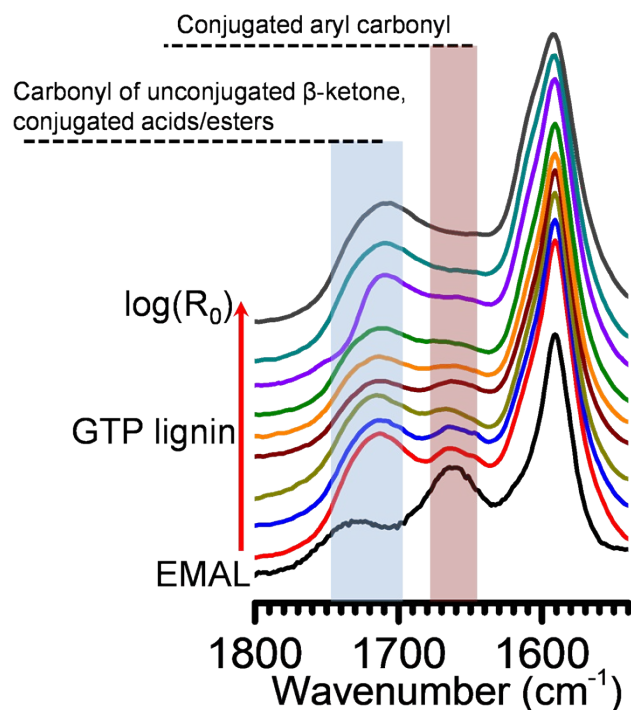
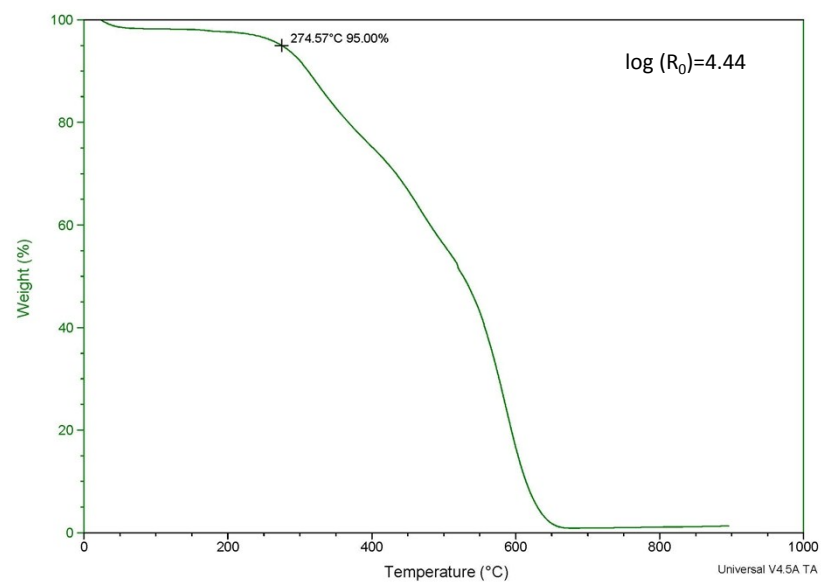
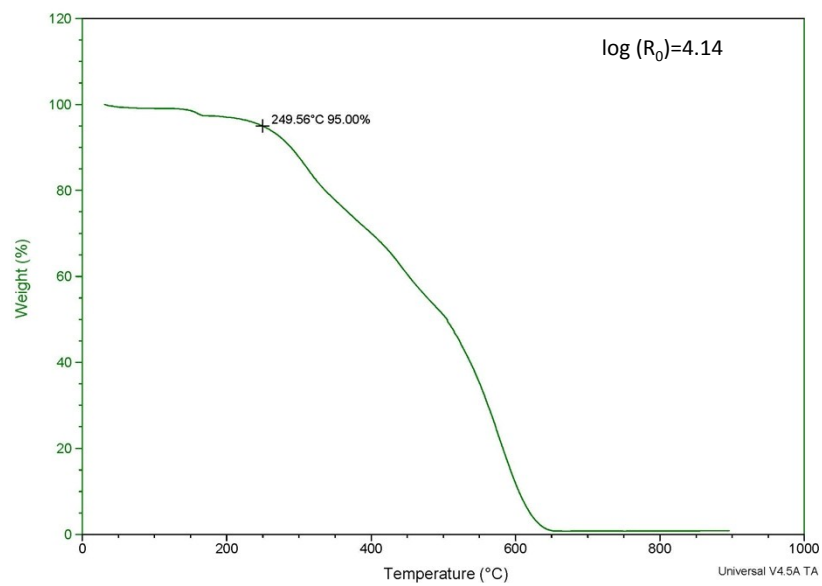
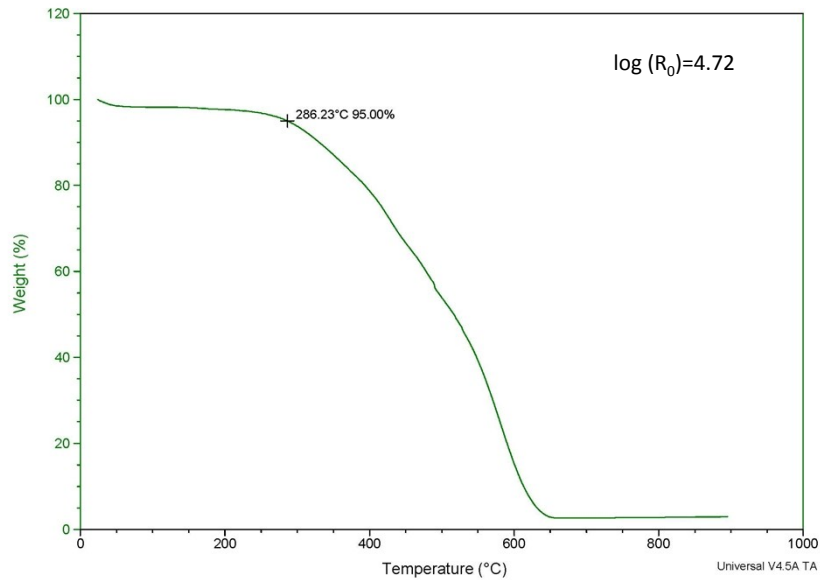
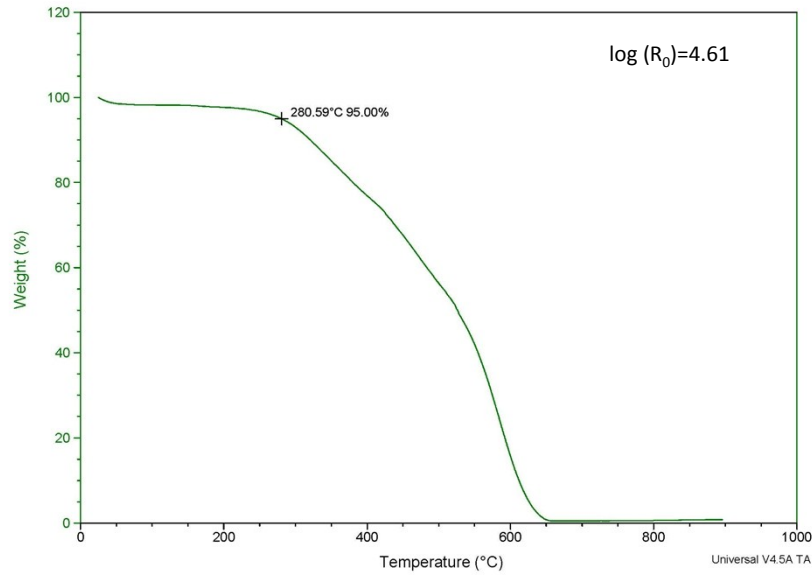


Figure S5. FTIR (1800-1540 cm^{-1}) of EMAL and GTP lignin as a function of $\log(R_0)$.





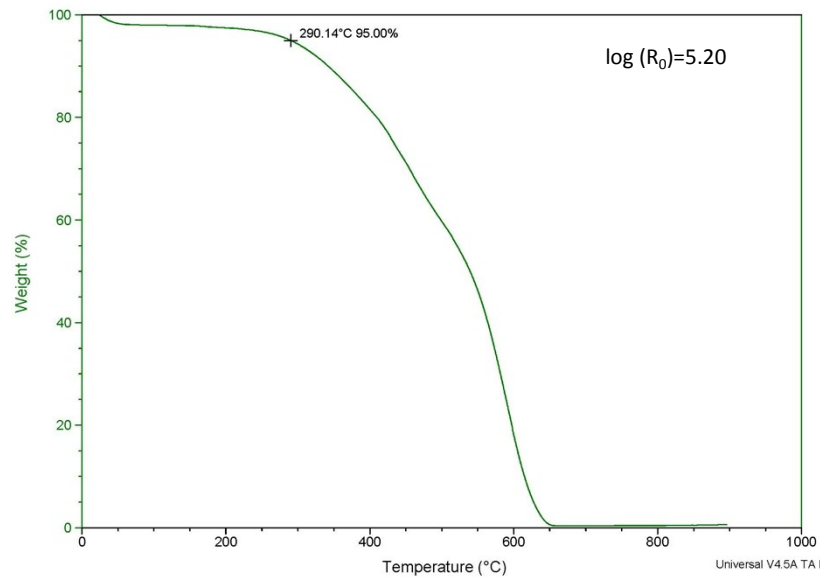
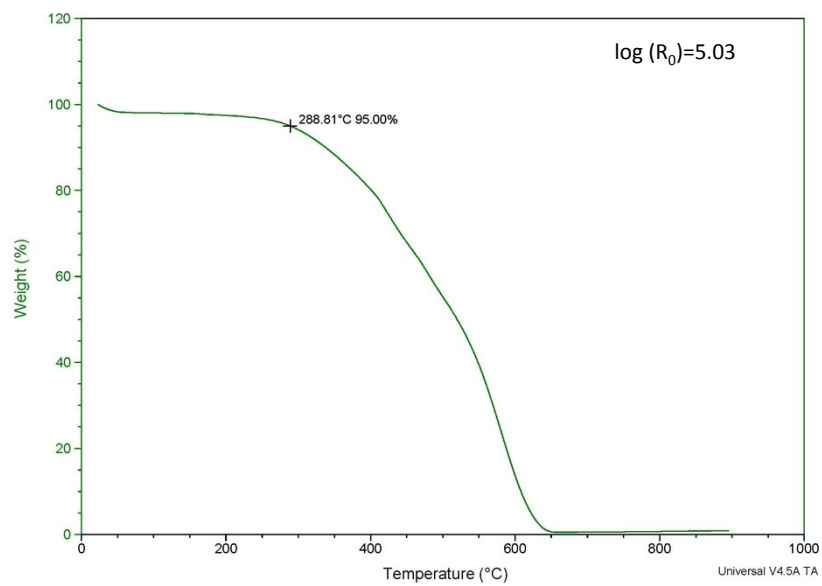
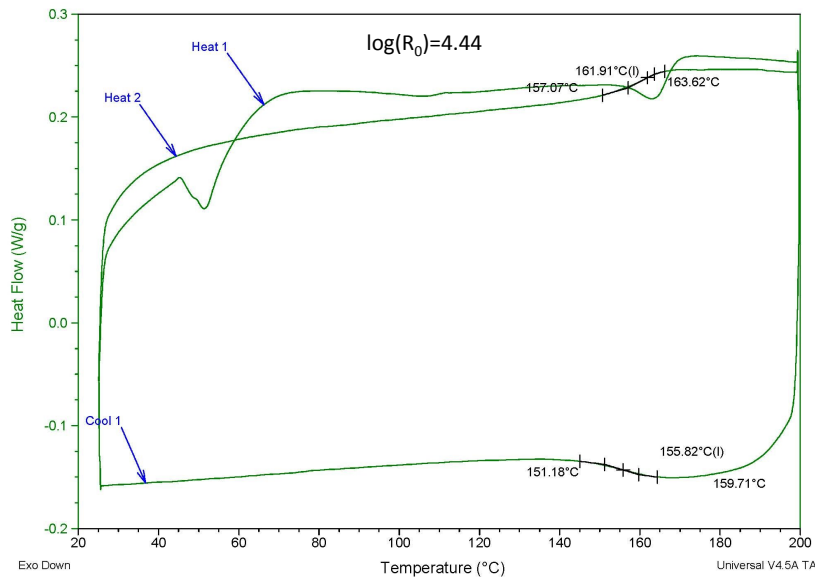
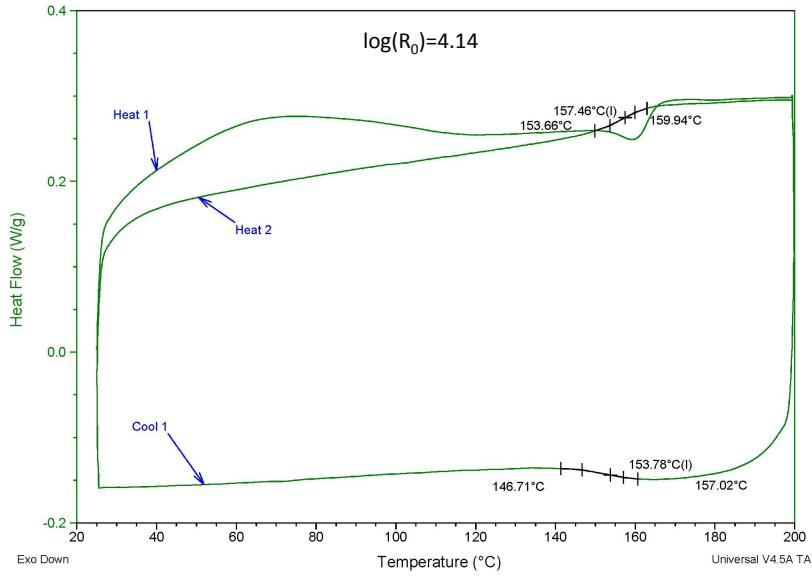
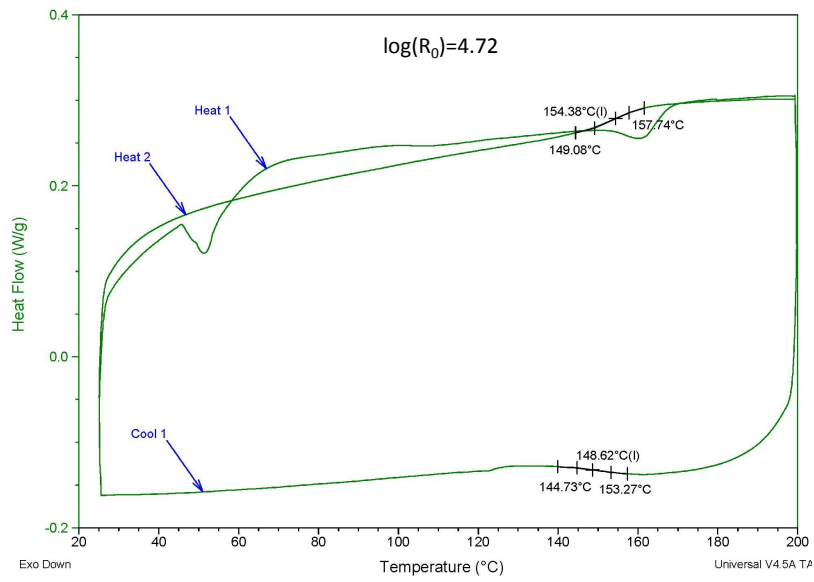
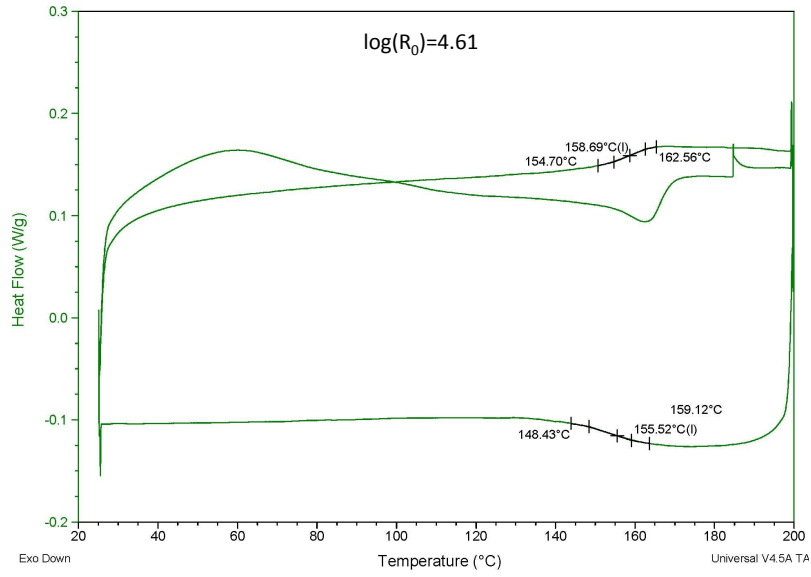


Figure S6. Represented TGA plots of GTP lignin with severity parameter listed for each lignin testes.





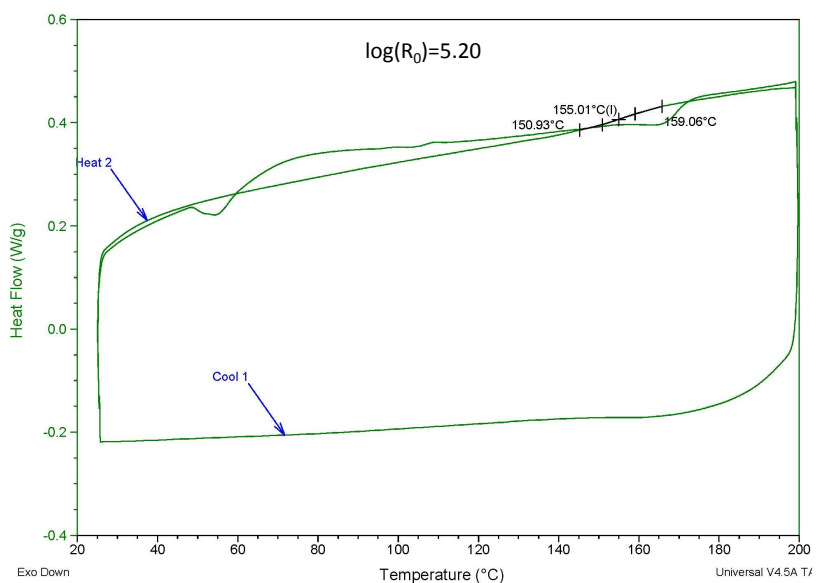
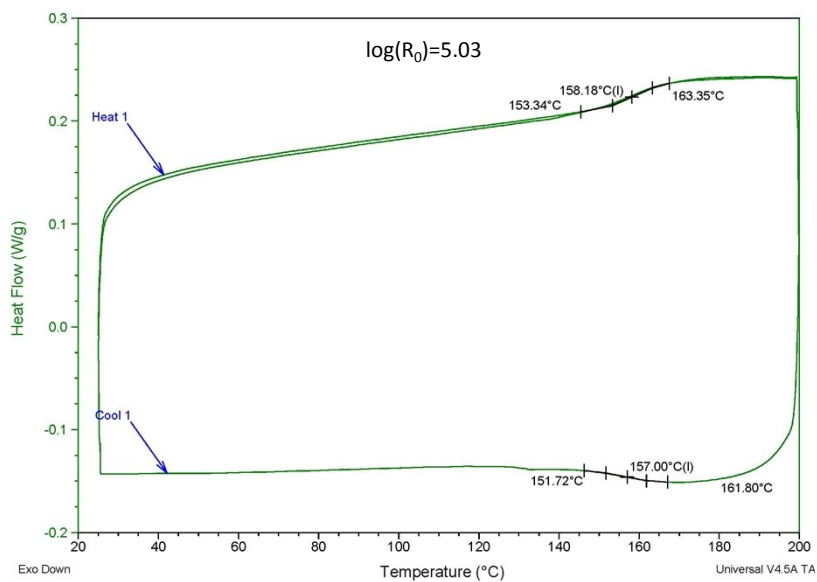


Figure S7. Represented DSC plots of GTP lignin.