

Supplementary data

Salen based Schiff bases to flame retard thermoplastic polyurethane mimicking operational strategies of thermosetting resin

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Table S1. Identification of the pyrolysates from pyGCMS on TPU and L2-TPU in desorption mode.

Desorption, 10°C/min	species	m/z	TPU	L2-TPU
150-250 °C	H ₂ O	18	√	√
	CO ₂	44	-	√
	THF	72	√	√
	1,4-butanediol	90	-	√
	resorcinol	110	-	√
	diphenylmethane diamine	198	-	√
	1,6-dioxacyclododecane-7,12-dione	200	√	√
	diphenylmethane diisocyanate	250	√	√
	3-butenyl-4-hydroxybutyladipate	272	-	√
250-300°C	CO ₂	44	-	√
	THF	72	-	√
	1,4-butanediol	90	√	√
	1,6-dioxacyclododecane-7,12-dione	198	√	√
	diphenylmethane diisocyanate	250	√	√
	4-hydroxybutyl adipic acid monoester	218	√	√
300-350°C	CO ₂	44	√	-
	THF	72	√	√
	cyclopentanone	84	√	-
	1,6-dioxacyclododecane-7,12-dione	200	√	√
	1,4-butanediol	90	√	√
	4-hydroxybutyl adipic acid monoester	218	√	√
	3-butenyl adipate	254	√	√
	diphenylmethane diisocyanate	250	√	√
	3-Butenyl-4-hydroxybutyl adipate	272	√	√
350-450°C	CO ₂	44	√	√
	cyclopentanone	84	√	√
	1,4-butane diol	90	√	√
	1,6-dioxacyclododecane-7,12-dione	200	√	√
	3-Butenyl-4-hydroxybutyl adipate	272	√	√
	p-toluidine	107	-	√
4-hydroxybutyl adipic acid monoester	218	√	√	

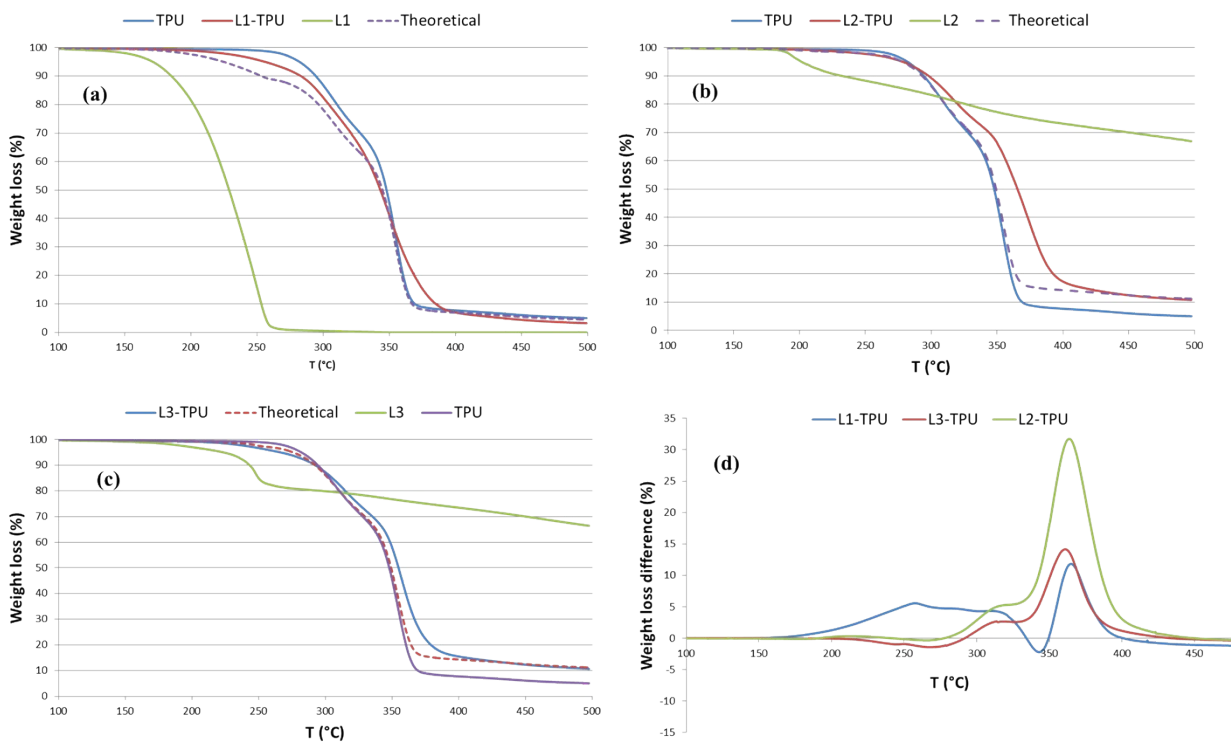


Figure S1. (a-c) Experimental and theoretical TGA profiles of L1-TPU, L2-TPU and L3-TPU respectively. (d) Curves of weight loss difference between theoretical and experimental TGA curves.

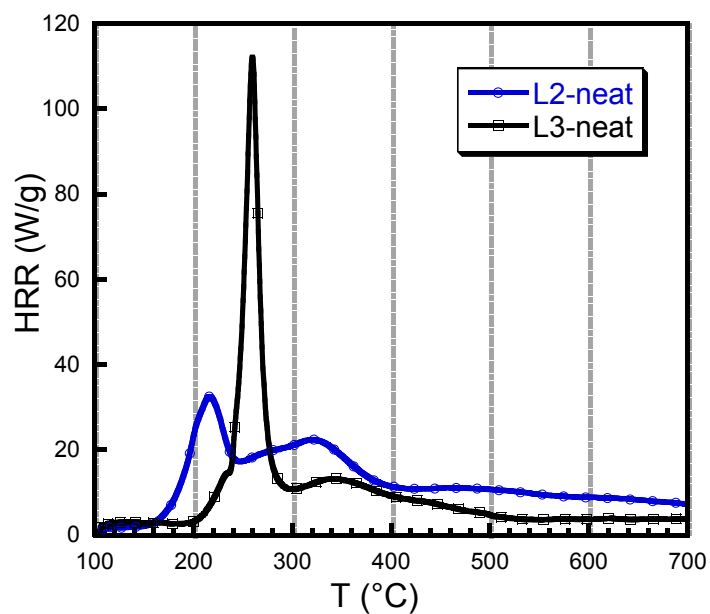


Figure S2. PCFC on neat L2 and L3.

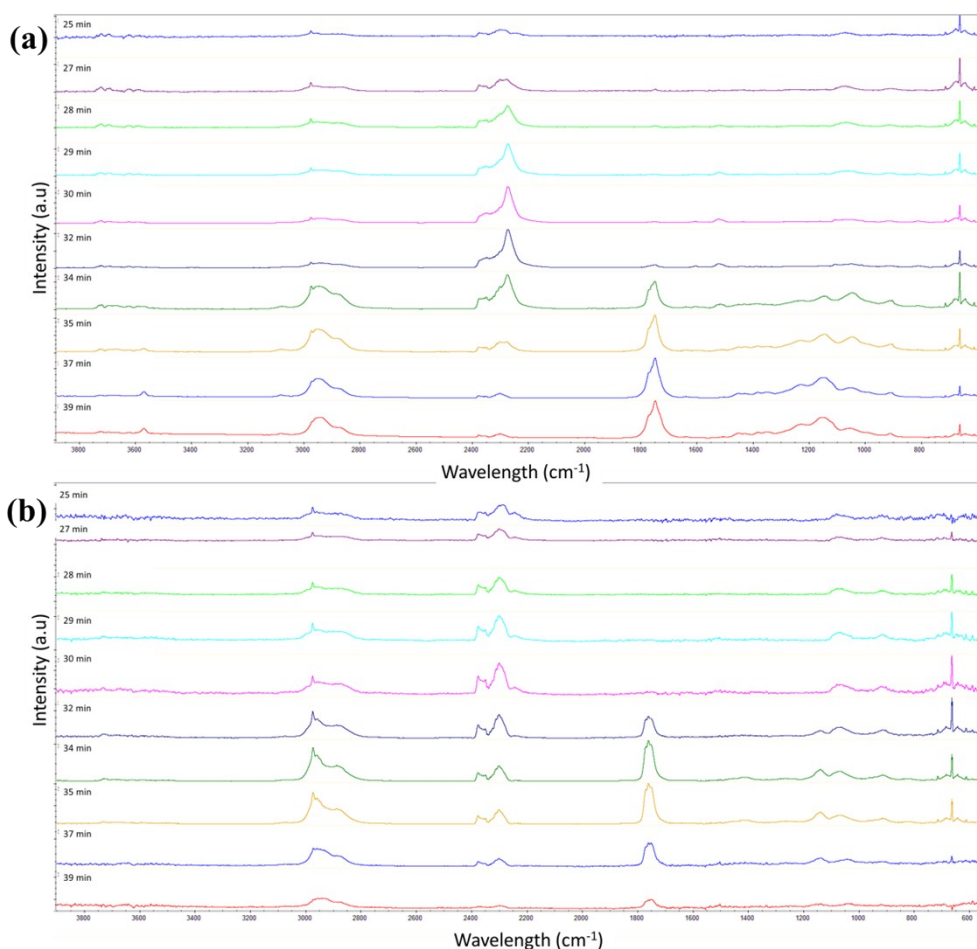


Figure S3. Evolution of species in (a) TPU and (b) L2-TPU studied by TGA-FTIR

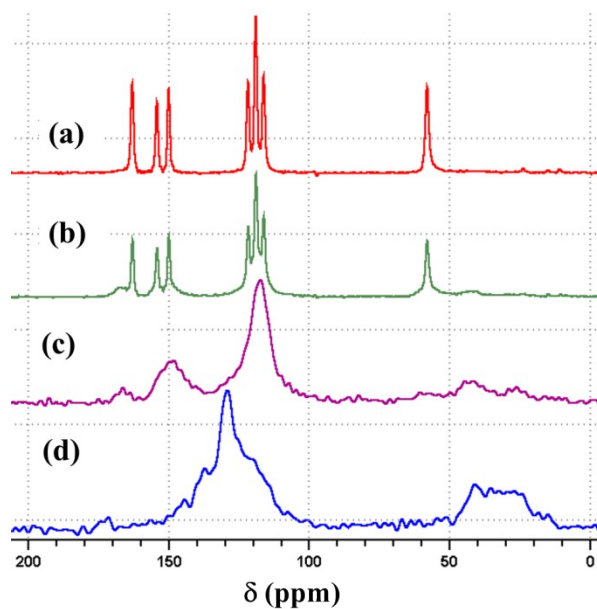


Figure S4. ^{13}C MAS NMR on (a) L3. (b) L3 heated to 800°C in furnace for 2s (new aromatic signals begin to appear). (c) sample obtained from further heating L3 in an oven until elastic intumescence is formed (d) L3-TPU thermally treated in a similar way until intumescence is formed. Aromatic and aliphatic signals corresponding to resin formation is seen.

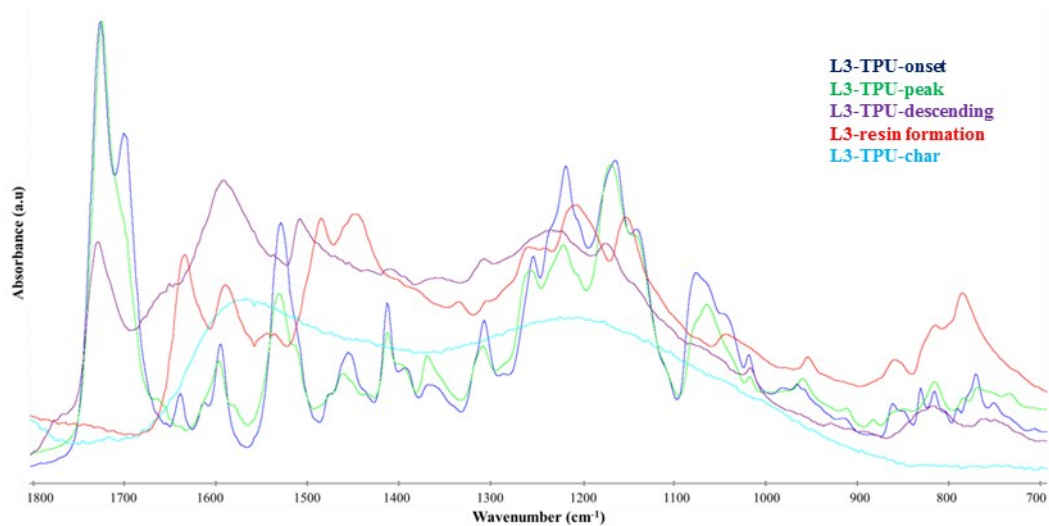


Figure S5. Expanded part of FTIR on samples collected from mass loss calorimetry (L3-TPU: onset, peak, descending and char refers to samples collected from mass loss calorimetry based on HRR curve which are at different stages of degradation). L3-resin is also showed for comparison.