Electronic Supplementary Material (ESI) for RSC Advances.

Table S1. The NMR assignments of major substructures in HSQC spectra of the SREL

Label	δ_C/δ_H (ppm)	Assignments
B_β	53.5/3.05	C_β−H_β in β-β (resinol) substructures (B)
−OCH_3	55.7/3.70	C−H in methoxyls
A_γ	59.5/3.69	C_γ−H_γ in β-O-4 substructures (A)
C_γ	62.0/3.70	C_γ–H_γ in phenylcoumaran substructures (C)
B_γ	71.0/3.79−4.16	C_γ−H_γ in β-β resinol substructures (B)
A_α	71.6/4.83	C_α−H_α in β-O-4 linked to a S unit (A)
A_β(G)	83.9/4.30	C_β−H_β in β-O-4 linked to G/H unit (A)
B_α	84.9/4.64	C_α−H_α in β-β resinol substructures (B)
A_β(S)	85.9/4.11	C_β−H_β in β-O-4 linked to a S unit (A)
$S_{2,6}$	104.0/6.72	$C_{2,6}$−$H_{2,6}$ in syringyl units (S)
$S'_{2,6}$	106.3/7.26	$C_{2,6}$−$H_{2,6}$ in oxidized S units (S′)
G_2	111.0/6.99	C_2−H_2 in guaiacyl units (G)
G_5	114.8/6.68-6.98	C_5−H_5 in guaiacyl units (G)
G_6	119.0/6.80	C_6−H_6 in guaiacyl units (G)

Table S2. Quantification of monomeric products from SREL depolymerization.

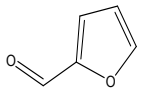
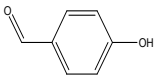
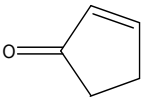
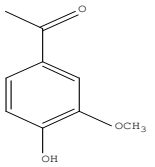
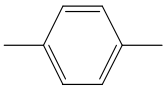
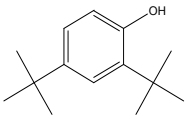
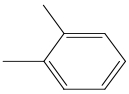
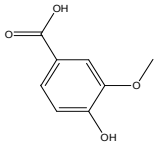
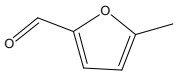
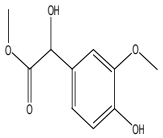
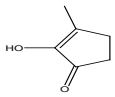
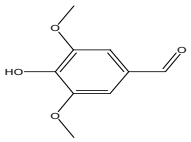
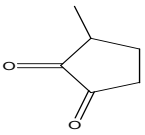
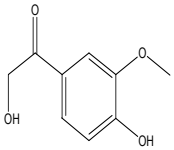
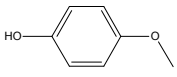
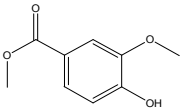
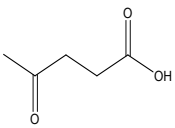
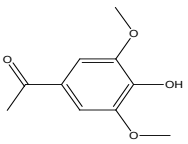
	Area percentage (%) [a]				
	140°C	150°C	160°C	170°C	180°C
phenols	0.25	0.17	0.16	0.13	0.60
Benzaldehyde, 4-hydroxy-	— [b]	—	—	—	0.03
Phenol, 2,4-bis(1,1-dimethylethyl)	0.25	0.17	0.16	0.12	0.12
4-Methoxy-phenol	—	—	—	0.01	0.11
Guaiacols	5.31	6.49	10.41	9.14	7.02
Vanillin	4.42	5.26	8.26	7.21	5.55
Benzaldehyde, 3-hydroxy-4-methoxy-	0.18	—	—	—	—
Ethanone,1-(4-hydroxy-3-methoxyphenyl)-	—	0.11	0.29	0.36	0.36
Benzoic acid, 4-hydroxy-3-methoxy-	0.71	0.87	1.36	1.27	1.11
Benzeneacetic acid, .alpha.,4-dihydroxy-3-methoxy-, methyl ester	—	0.04	—	—	—
2,4'-Dihydroxy-3'-methoxyacetophenone	—	—	0.5	0.19	—
Benzoic acid, 4-hydroxy-3-methoxy-, methyl ester	—	0.21	—	0.11	—
syringols	23.28	28.23	38.04	30.74	25.75
Phenol, 2,6-dimethoxy-	0.33	0.27	0.54	1.08	1.61
syringaldehyde	19.07	23.21	31.7	24.47	19.77
Ethanone, 1-(4-hydroxy-3,5-dimethoxyphenyl)-	1.23	1.5	1.97	1.81	1.59
3,5-Dimethoxy-4-hydroxyphenylacetic acid	—	0.21	—	—	—
Benzoic acid, 4-hydroxy-3,5-dimethoxy-	1.81	2.62	3.57	3.38	2.78
3,5-Dimethoxy-4-hydroxycinnamaldehyde	0.84	0.42	0.26	—	—
others	2.26	4.30	3.32	2.97	5.93
p-Xylene	0.01	0.03	—	—	—
o-Xylene	0.01	0.05	—	—	—
Benzaldehyde, 3,5-dimethyl-	—	0.07	0.08	0.05	0.06
Benzaldehyde, 3,4-dimethyl-	—	—	—	0.05	—
Bis(2-ethylhexyl) phthalate	0.49	0.41	0.28	—	—
Phenol, 4,4'-methylenebis[2,6-dimethoxy-	0.09	—	—	—	—
1,2-Cyclopentanedione, 3-methyl-	—	—	—	—	0.03
2-Cyclopenten-1-one, 2-hydroxy-3-methyl-	—	—	—	—	0.08
2-Cyclopenten-1-one	—	0.06	0.07	—	0.08
Furfural	—	0.52	—	—	—
5-Hydroxymethylfurfural	1.66	2.87	1.63	1.08	
2-Furancarboxaldehyde, 5-methyl-	—	0.04	—	—	—
Pentanoic acid, 4-oxo-	—	0.25	1.26	1.79	5.68
Total [c]	31.10	39.19	51.93	42.98	39.3

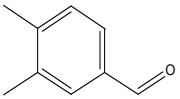
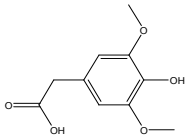
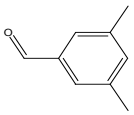
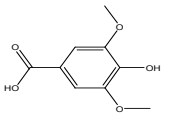
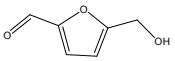
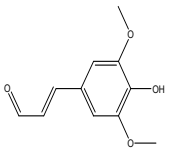
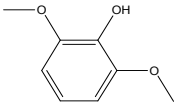
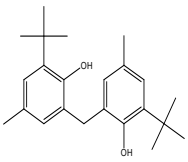
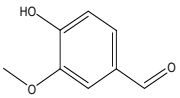
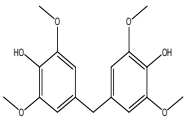
[a] The matching degree of all the compounds here were more than 80%, and the compounds whose matching degrees less than 80% were not listed.

[b] Not detected.

[c] The whole relative peak area percentage of the compounds whose matching degrees more than 80%.

Table S3. The main components of the lignin-derived volatile fraction in bio-oil

RT (min)	Compound	Structure	RT (min)	Compound	Structure
10.015	Furfural		55.552	Benzaldehyde, 4-hydroxy-	
10.128	2-Cyclopenten-1-one		58.651	Ethanone,1-(4-hydroxy-3-methoxyphenyl)-	
12.354	p-Xylene		60.097	Phenol, 2,4-bis(1,1-dimethylethyl)	
14.200	o-Xylene		65.194	Benzoic acid, 4-hydroxy-3-methoxy-	
20.959	2-Furancarboxaldehyde, 5-methyl-		67.359	Benzeneacetic acid, .alpha.,4-dihydroxy-3-methoxy-, methyl ester	
26.446	2-Cyclopenten-1-one, 2-hydroxy-3-methyl-		69.235	Benzaldehyde, 4-hydroxy-3,5-dimethoxy-	
26.856	1,2-Cyclopentanedione, 3-methyl-		70.179	2,4'-Dihydroxy-3'-methoxyacetophenone	
31.595	4-Methoxy-phenol		70.598	Benzoic acid, 4-hydroxy-3-methoxy-, methyl ester	
32.938	Pentanoic acid, 4-oxo-		72.599	Ethanone, 1-(4-hydroxy-3,5-dimethoxyphenyl)-	

40.055	Benzaldehyde, 3,4-dimethyl-		74.517	3,5-Dimethoxy-4-hydroxyphenylacetic acid	
40.105	Benzaldehyde, 3,5-dimethyl-		78.569	Benzoic acid, 4-hydroxy-3,5-dimethoxy-	
43.533	5-Hydroxymethylfurfural		84.979	3,5-Dimethoxy-4-hydroxycinnamaldehyde	
49.923	Phenol, 2,6-dimethoxy-		103.153	Phenol,2,2'-methylenebis[6-(1,1-dimethylethyl)-4-methyl-	
53.235	Vanillin		114.969	Phenol, 4,4'-methylenebis[2,6-dimethoxy-	
54.569	Benzaldehyde, 3-hydroxy-4-methoxy-