

Supporting information

One step thermal conversion of lignin to the gasoline range liquid products by using zeolites as additives

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GC-MS analysis of pyrolysis products

The GC-MS analysis of pyrolysis products was conducted by Agilent 5975C MSD and 7890A GC with a 7693 auto sampler. The Agilent HP-5MS, 19091S-433 column was used. The GC oven was programmed with the following temperature regime: hold at 50 °C for 5 min, ramp to 80 °C at 5 °C/min and hold at 80 °C for 5 min, then ramp to 200 °C at 2 °C/min and hold at 200 °C for 5 min.

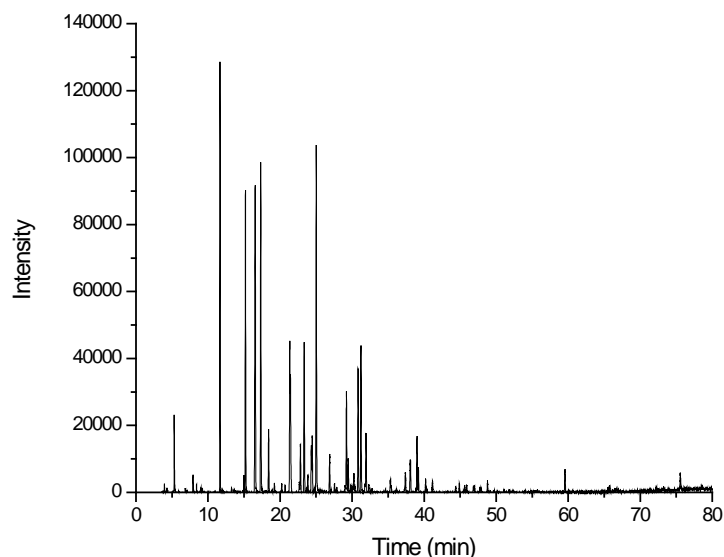


Figure S1. GC-MS spectrum for the heavy oil produced by pyrolysis of pure SW kraft lignin with 1.0/1.0 ($W_{\text{additive}}/W_{\text{lignin}}$) of Y zeolite as additive at 600 °C for 10 min.

Table S1. Chemical composition of heavy oil produced by pyrolysis of pure SW kraft lignin with 1.0/1.0 ($W_{\text{additive}}/W_{\text{lignin}}$) of Y zeolite as additive at 600 °C for 10 min, detected by GC-MS.

RT (min)	Area (%)	Chemical name
5.30	1.65	3-Penten-2-one, 4-methyl-
11.67	9.25	Phenol
15.20	9.13	Phenol, 2-methyl-
16.55	14.31	Phenol, 3-methyl-
17.32	11.49	Phenol, 2-methoxy-

18.41	2.09	Phenol, 2,6-dimethyl-
21.35	5.18	Phenol, 2,4-dimethyl-
21.44	4.51	Phenol, 2,4-dimethyl-
22.83	1.82	Phenol, 3,5-dimethyl-
23.35	6.22	Naphthalene
24.34	1.57	Phenol, 2-methoxy-4-methyl-
24.47	2.21	Phenol, 3,4-dimethyl-
25.03	12.62	1,2-Benzenediol
29.22	3.53	1,2-Benzenediol, 3-methyl-
30.84	4.78	Naphthalene, 1-methyl-
31.24	5.60	1,2-Benzenediol, 4-methyl-
31.94	2.09	Naphthalene, 1-methyl-
39.02	1.93	Naphthalene, 1,4-dimethyl-

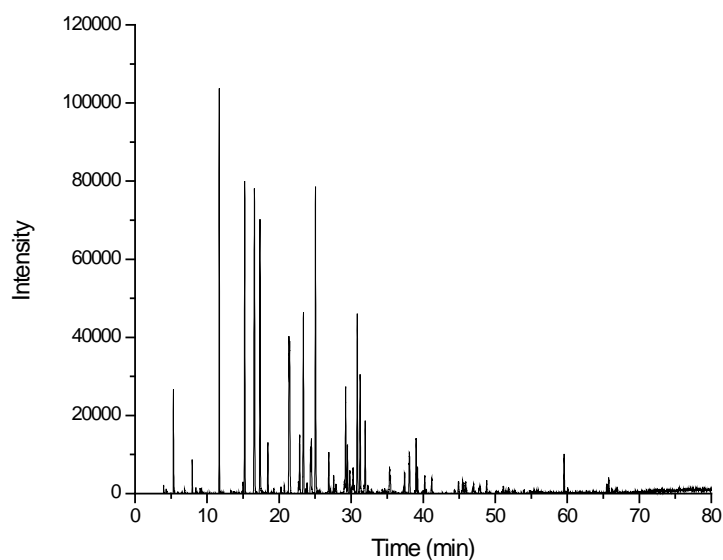


Figure S2. GC-MS spectrum for the heavy oil produced by pyrolysis of pure SW kraft lignin with 1.0/1.0 ($W_{\text{additive}}/W_{\text{lignin}}$) of Beta zeolite as additive at 600 °C for 10 min.

Table S2. Chemical composition of heavy oil produced by pyrolysis of pure SW kraft lignin with 1.0/1.0 ($W_{\text{additive}}/W_{\text{lignin}}$) of Beta zeolite as additive at 600 °C for 10 min, detected by GC-MS.

RT (min)	Area (%)	Chemical name
5.32	2.34	3-Penten-2-one, 4-methyl-
11.69	9.15	Phenol
15.23	9.96	Phenol, 2-methyl-
16.58	14.95	Phenol, 4-methyl-
17.34	9.96	Phenol, 2-methoxy-
21.38	5.41	Phenol, 2,4-dimethyl-
21.46	5.92	Phenol, 2,5-dimethyl-
22.85	2.12	Phenol, 3,5-dimethyl-
23.37	7.53	Azulene
25.04	11.82	1,2-Benzenediol
29.23	3.78	1,2-Benzenediol, 3-methyl-
30.85	7.14	Naphthalene, 2-methyl-
31.25	4.68	1,2-Benzenediol, 4-methyl-
31.95	3.19	Naphthalene, 2-methyl-
39.02	2.08	Naphthalene, 1,3-dimethyl-