SUPPLEMENTARY MATERIALS

Formation characteristics of PCDD/Fs in the co-combustion and pyrolysis process of coal and sewage sludge

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Table S1. The proximate and ultimate analysis of coal and sewage sludge (%).

Samples	Proximate analysis				Ultimate analysis				
	Mad	Aad	Vad	Fcad	Cad	Had	Nad	St,ad	Oad
Coal	5.69	11.75	28.26	54.3	66.73	3.3	0.74	0.51	11.28
Sewage sludge	54.44	30.06	13.68	1.82	6.04	0.89	0.59	0.88	7.09

Table S2. The relative importance of PCDD/F congeners（%）.

Isomer	S-P	S-C	M-0%	M-2.5%	M-5%
TCDD					
1,3,6,8-	3.4	19.3	41.1	33.9	2.2
1,3,7,9-	2.4	10.4	22.0	20.8	3.4
1,3,6,9-	1.4	1.7	2.8	2.3	3.8
1,4,6,9-	0.1	0.3	1.5	1.1	3.8
1,2,4,7/1,2,4,8/1,2,4,6/1,2,4,9-	1.3	2.6	3.9	4.8	10.3
1,3,7,8-	1.2	2.5	3.5	4.2	4.2
1,2,6,8-	0.7	1.3	1.8	3.2	5.2
1,4,7,8-	0.1	0.0	1.3	0.9	11.1
1,2,7,9-	0.9	1.4	3.4	2.0	21.1
1,2,3,4/1,2,6,9-	0.3	1.5	3.2	2.6	6.9
1,2,3,6-	0.2	1.2	3.3	4.2	2.1
1,2,3,7/1,2,3,8-	50.2	28.9	4.2	8.8	8.4
1,2,3,9-	36.4	26.5	1.0	1.3	5.2
2,3,7,8-	0.6	0.9	2.6	4.9	4.0
1,2,7,8-	0.6	0.8	1.5	0.6	2.4
1,2,6,7-	0.2	0.3	1.3	1.0	3.4
1,2,8,9-	0.2	0.5	1.6	3.2	2.5
PeCDD	**S-P**	**S-C**	**M-0%**	**M-2.5%**	**M-5%**
1,2,4,7,9/1,2,4,6,8-	91.5	87.8	69.1	87.6	88.7
1,2,4,6,9-	0.8	0.3	1.2	0.9	3.6
1,2,3,6,8-	0.6	5.0	10.3	3.9	0.7
1,2,4,7,8-	0.5	0.4	1.2	0.7	0.8
1,2,3,7,9-	2.6	3.5	7.2	2.9	2.2
1,2,3,6,9/1,2,4,6,7/1,2,4,8,9-	0.8	0.6	1.8	1.1	0.5
1,2,3,4,7/1,2,3,4,6-	0.5	1.3	4.3	1.2	0.6
1,2,3,7,8-	2.1	0.6	1.1	1.0	0.9
1,2,3,6,7-	0.3	0.3	2.8	0.5	1.1
1,2,3,8,9-	0.3	0.2	1.1	0.3	0.9
HxCDD	**S-P**	**S-C**	**M-0%**	**M-2.5%**	**M-5%**
1,2,4,6,7,9/1,2,4,6,8,9-	13.7	6.4	2.3	4.8	12.0
1,2,3,4,6,8-	37.7	62.6	18.0	14.9	37.1
1,2,3,6,7,9/1,2,3,6,8,9-	25.3	13.8	38.9	39.3	19.7
1,2,3,4,6,9-	1.7	1.7	20.6	17.3	8.7
1,2,3,4,7,8-	2.8	2.8	2.4	3.4	3.4
1,2,3,6,7,8-	8.2	5.0	4.4	4.8	4.7
1,2,3,4,6,7-	2.6	2.5	5.0	7.8	7.4
1,2,3,7,8,9-	8.0	5.2	8.3	7.8	7.0
HpCDD	**S-P**	**S-C**	**M-0%**	**M-2.5%**	**M-5%**
1,2,3,4,6,7,9-	48.3	48.0	51.6	58.3	52.1
1,2,3,4,6,7,8-	51.7	52.0	48.4	41.7	47.9

OCDD	**S-P**	**S-C**	**M-0%**	**M-2.5%**	**M-5%**
1,2,3,4,6,7,8,9-	9.1	22.1	46.4	42.5	9.3
TCDF	**S-P**	**S-C**	**M-0%**	**M-2.5%**	**M-5%**
1,3,6,8-	4.1	3.8	3.5	3.9	4.3
1,4,6,8-	1.9	2.1	7.6	3.1	2.8
2,4,6,8-	8.7	4.3	10.1	2.9	2.7
1,2,4,7/1,3,4,7/1,3,7,8/1,3,4,6/1,2,4,6-	9.5	11.6	11.1	14.3	14.1
1,3,6,7/1,3,4,8/1,3,7,9/1,2,4,8-	7.2	8.1	9.0	9.4	10.4
1,2,6,8-	3.8	3.5	2.1	3.8	3.8
1,4,6,7-	1.2	1.2	1.1	2.1	2.3
1,4,7,8-	1.9	2.2	1.9	3.0	3.8
1,3,6,9/1,2,3,7-	9.6	9.2	3.9	7.3	6.8
2,4,6,7-	5.2	3.6	1.6	3.0	3.4
1,2,3,8/1,2,3,6/1,4,6,9/1,6,7,8/1,2,3,4/2,3,6,8-	18.8	21.6	5.9	12.3	11.0
1,2,7,8/1,3,4,9-	3.8	4.4	5.7	5.9	7.6
1,2,6,7-	2.0	2.3	4.8	4.1	4.1
2,3,4,6/1,2,4,9-	2.5	2.2	4.1	2.5	0.9
2,3,4,7/1,2,7,9-	3.2	3.8	3.8	3.2	3.3
2,3,4,8-	5.2	3.9	2.2	1.8	2.0
2,3,7,8-	1.8	1.7	3.4	2.5	3.2
2,3,6,7/3,4,6,7-	6.6	6.8	12.4	8.8	7.4
1,2,6,9-	1.1	1.0	4.1	2.0	1.6
1,2,3,9-	1.0	1.5	1.2	3.1	2.7
1,2,8,9-	0.8	1.3	0.5	1.1	1.7
PeCDF	**S-P**	**S-C**	**M-0%**	**M-2.5%**	**M-5%**
1,3,6,7,8/1,3,4,6,7/1,2,4,6,7-	2.4	5.6	9.1	7.7	3.9
1,2,3,6,8/1,3,4,7,8/1,2,4,7,8-	41.9	44.4	29.9	34.1	49.4
1,4,6,7,8-	38.8	22.5	6.3	20.6	29.5
1,3,4,7,9-	5.0	0.4	4.4	2.4	1.5
1,2,4,7,9/1,3,4,6,9-	3.0	1.0	2.5	1.7	0.8
1,2,3,4,6-	0.8	6.6	6.2	4.4	2.1
2,3,4,6,8/1,2,4,6,9/1,2,3,4,7-	0.8	1.9	3.4	2.6	1.1
1,2,3,4,8-	0.8	2.9	2.9	1.9	0.5
1,2,3,7,8-	1.1	2.1	5.8	4.2	2.5
1,2,3,6,7/1,2,6,7,8-	1.8	3.7	8.3	5.6	2.5
1,2,3,7,9-	0.4	0.5	1.9	1.4	1.0
1,2,6,7,9-	0.2	0.3	2.2	1.7	0.3
1,2,3,6,9/2,3,4,6,7-	1.8	4.1	7.9	6.0	2.7
2,3,4,7,8/1,2,4,8,9-	0.8	3.1	4.9	3.5	1.1
1,2,3,4,9-	0.3	0.7	2.3	1.6	0.7
1,2,3,8,9-	0.0	0.2	2.2	0.6	0.5
HxCDF	**S-P**	**S-C**	**M-0%**	**M-2.5%**	**M-5%**
1,2,3,4,6,8-	10.6	13.8	7.5	8.8	8.8
1,3,4,6,7,8/1,2,4,6,7,8-	26.6	24.1	26.0	24.2	24.7

1,3,4,6,7,9-	1.9	2.7	3.5	4.8	4.2
1,2,4,6,7,9-	3.2	3.7	6.2	4.4	4.3
1,2,4,6,8,9-	1.4	2.4	3.1	2.7	2.8
1,2,3,4,6,7-	13.7	12.3	13.3	12.4	12.7
1,2,3,4,7,8-	9.3	8.4	7.2	6.8	6.8
1,2,3,6,7,8-	10.0	8.8	8.5	8.0	9.7
1,2,3,4,7,9-	2.8	3.1	4.0	6.6	5.9
1,2,3,4,6,9-	2.5	3.3	4.0	4.7	4.1
1,2,3,6,7,9-	2.7	2.4	5.7	6.1	5.3
2,3,4,6,7,8/1,2,3,6,8,9-	4.1	4.0	3.2	2.5	3.1
1,2,3,7,8,9/1,2,3,4,8,9-	11.2	10.8	7.8	8.1	7.6
HpCDF	**S-P**	**S-C**	**M-0%**	**M-2.5%**	**M-5%**
1,2,3,4,6,7,8-	61.0	60.1	47.2	43.0	50.3
1,2,3,4,6,7,9-	15.4	15.4	13.9	17.0	15.4
1,2,3,4,6,8,9-	12.6	14.4	28.4	28.7	23.6
1,2,3,4,7,8,9-	11.0	10.1	10.5	11.3	10.8
OCDF	**S-P**	**S-C**	**M-0%**	**M-2.5%**	**M-5%**
1,2,3,4,6,7,8,9-	41.2	48.4	54.2	66.9	71.7

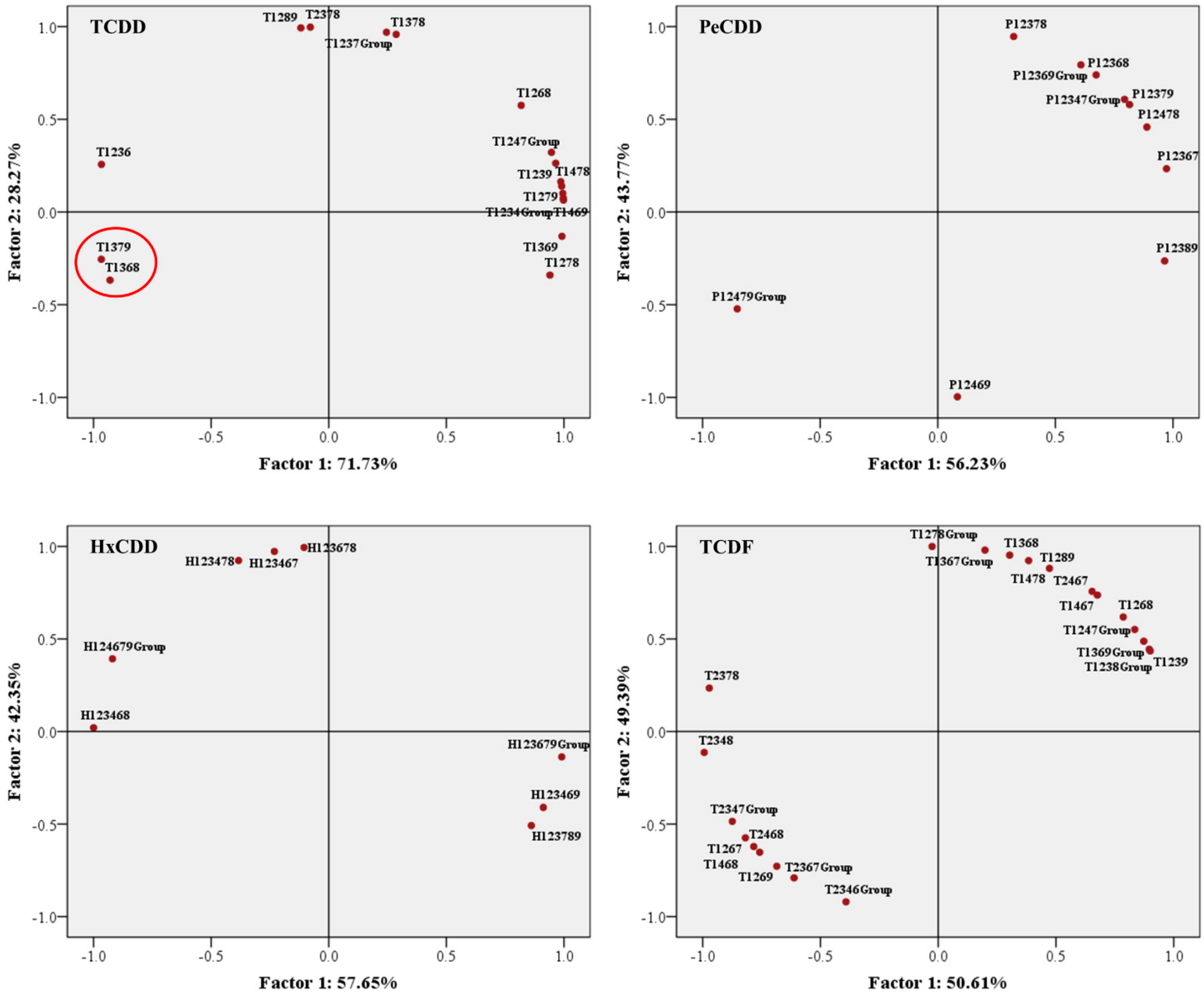

Figure S1. Principal component analysis results of TCDD, PeCDD, HxCDD and TCDF congeners.