

Supplementary Materials:

Review on Source Profiles of Volatile Organic Compounds (VOCs) in Typical Industries in China

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Table S1. The mass fraction of chemical groups of original profiles for petrochemical industry. (Unit: %)

Profile name	Location	Data	Sampling and analysis methods	No. samples	No. species	Percentage of chemical groups					Reference
						Alkanes	Alkenes	Aromatics	Halocarbons	OVOCs	
Petrochemical industry	Beijing	-	Canister-GC-MS/FID	5	56	56.78	20.40	19.18	0.24	0.00	Wei et al, 2014 ^[1]
Petrochemical industry	YRD	-	Canister-GC-MS/FID	25	61	64.10	21.00	9.30	5.00	0.00	Mo et al, 2015 ^[2]
Petrochemical industry	Northern China	-	Canister-GC-MS/FID	5	85	55.59	16.65	15.24	12.50	0.00	Qi, 2018 ^[3]
Petrochemical industry	Wuhan	2016–2017	Canister-GC-MS/FID	6	72	69.79	9.76	14.68	3.58	3.17	Shen et al, 2018 ^[4]
Heating furnace	Northern China	-	Canister-GC-MS/FID	5	85	54.69	14.06	31.25	0.00	0.00	Qi, 2018 ^[3]
	Wuhan	2016–2017	Canister-GC-MS/FID	6	72	67.06	6.82	22.73	2.84	0.57	Shen et al, 2018 ^[4]
Catalytic cracking	YRD	-	Canister-GC-MS/FID	25	61	64.47	21.49	9.35	5.14	0.00	Mo et al, 2015 ^[2]
	Wuhan	2016–2017	Canister-GC-MS/FID	6	72	82.75	11.08	4.55	0.49	1.14	Shen et al, 2018 ^[4]
Hydrocracking	YRD	-	Canister-GC-MS/FID	25	61	86.79	6.60	3.77	3.77	0.00	Mo et al, 2015 ^[2]
	Wuhan	2016–2017	Canister-GC-MS/FID	6	72	71.44	11.37	12.22	3.13	2.28	Shen et al, 2018 ^[4]
Catalytic reforming	YRD	-	Canister-GC-MS/FID	25	61	71.90	5.14	21.97	1.87	0.00	Mo et al, 2015 ^[2]
	Northern China	-	Canister-GC-MS/FID	5	85	50.00	3.13	46.88	0.00	0.00	Qi, 2018 ^[3]
Delayed coking	Wuhan	2016–2017	Canister-GC-MS/FID	6	72	78.74	3.98	13.92	3.41	0.00	Shen et al, 2018 ^[4]
	YRD	-	Canister-GC-MS/FID	25	61	77.49	2.34	17.76	2.80	0.00	Mo et al, 2015 ^[2]
Sulfur recovery	Wuhan	2016–2017	Canister-GC-MS/FID	6	72	39.09	9.38	24.15	8.24	19.32	Shen et al, 2018 ^[4]
	Northern China	-	Canister-GC-MS/FID	5	85	81.94	13.18	4.88	0.00	0.00	Qi, 2018 ^[3]
Oxidation pond	YRD	-	Canister-GC-MS/FID	25	61	37.74	28.30	8.49	25.47	0.00	Mo et al, 2015 ^[2]
Sewage	YRD	-	Canister-	25		66.22	25.23	6.55	2.80	0.00	Mo et al, 2015 ^[2]

stripping			GC-MS/FID								
	YRD	-	Canister- GC-MS/FID	25	61	23.11	60.28	9.81	6.54	0.00	Mo et al, 2015 ^[2]
Gasoline tank	Northern China	-	Canister- GC-MS/FID	5	85	74.87	12.65	12.48	0.00	0.00	Qi, 2018 ^[3]
	Wuhan	2016–2017	Canister- GC-MS/FID	6	72	97.67	0.57	1.42	0.00	0.57	Shen et al, 2018 ^[4]
	YRD	-	Canister- GC-MS/FID	25	61	54.87	21.96	7.94	15.89	0.00	Mo et al, 2015 ^[2]
Diesel tank	Northern China	-	Canister- GC-MS/FID	5	85	52.38	3.81	43.81	0.00	0.00	Qi, 2018 ^[3]
Crude oil tank	Northern China	-	Canister- GC-MS/FID	5	85	82.33	4.19	13.49	0.00	0.00	Qi, 2018 ^[3]

Table S2 The mass fraction of chemical groups of merged profiles for petrochemical industry.
(Unit: %)

Profile name	Alkanes	Alkenes	Aromatic	Halocarbons	OVOCs
Petrochemical industry	60.58	16.68	14.37	5.24	3.12
Heating furnace	59.84	10.27	26.53	2.80	0.56
Catalytic cracking	73.03	16.16	6.89	2.79	1.13
Hydrocracking	77.70	8.82	7.85	3.39	2.23
Catalytic reforming	66.09	4.03	27.26	2.61	0.00
Delayed coking	53.02	5.33	19.06	5.02	17.57
Sulfur recovery	81.94	13.18	4.88	0.00	0.00
Oxidation pond	37.74	28.30	8.49	25.47	0.00
Sewage stripping	65.69	25.03	6.49	2.78	0.00
Gasoline tank	64.28	24.15	7.79	3.22	0.56
Diesel tank	49.53	11.90	23.90	14.67	0.00
Crude oil tank	82.33	4.19	13.49	0.00	0.00

Table S3 The mass fraction of chemical groups of original profiles for industrial solvent-used industry. (Unit: %)

Profile name	Location	Data	Sampling and analysis methods	No. samples	No. species	Percentage of chemical groups					Reference
						alkanes	alkenes	aromatics	halocarbons	OVOCs	
Gravure printing	PRD	2010	Canister-GC-MS	20	94	1.38	0.01	10.79	0.06	87.76	Yang et al, 2013 ^[5]
	Nanjing	-	Bag-GC-MS	-	47	30.16	15.71	4.29	12.30	36.01	Xie et al, 2018 ^[6]
	China	-	-	4	212	28.09	4.36	8.10	3.63	52.30	Liang et al, 2020 ^[7]
Lithographic printing	PRD	2010	Canister-GC-MS	20	94	47.30	5.37	23.97	1.59	21.78	Yang et al, 2013 ^[5]
	Nanjing	-	Bag-GC-MS	-	47	17.35	5.00	3.26	11.75	57.75	Xie et al, 2018 ^[6]
Letterpress printing	PRD	2010	Canister-GC-MS	20	94	6.00	0.04	19.33	4.08	8.29	Yang et al, 2013 ^[5]
	Nanjing	-	Bag-GC-MS	-	47	20.71	3.07	1.57	19.97	50.95	Xie et al, 2018 ^[6]
Offset printing	China	-	-	4	212	32.88	2.23	17.91	1.73	34.39	Liang et al, 2020 ^[7]
Dyeing	PRD	-	Canister-GC-MS	16	52	3.09	0.18	43.10	0.00	53.50	Zhong et al, 2017 ^[8]
	China	-	-	4	212	0.00	0.00	35.02	1.10	60.26	Liang et al, 2020 ^[7]
	Beijing	-	Canister-GC-MS/FID	22	106	0.58	0.00	27.14	1.01	71.26	Fang et al, 2019 ^[9]
Automobile	Southern China	-	GC-MS	11	120	12.43	2.49	19.01	15.74	47.48	Zhai et al, 2018 ^[10]
	Southern China	-	GC-MS	11	120	4.68	9.50	40.93	4.13	40.48	Zhai et al, 2018 ^[10]
	Beijing	-	Canister-GC-MS/FID	22	106	3.27	0.18	84.10	4.47	7.86	Fang et al, 2019 ^[9]
Furniture	PRD	-	Canister-GC-MS	16	52	7.01	0.1	54.77	0.01	38.18	Zhong et al, 2017 ^[8]
	Beijing	-	Canister-GC-MS/FID	22	106	17.42	0.32	18.98	8.18	55.08	Fang et al, 2019 ^[9]
	Zhengzhou	-	Bag-GC-MS	4	104	0.30	1.40	0.50	12.30	85.50	Zhang et al, 2020 ^[11]
	PRD	-	Canister-GC-MS	16	52	13.10	0.91	63.40	0.00	19.60	Zhong et al, 2017 ^[8]
Metal	PRD	-	Canister-GC-MA/FID	-	63	10.28		54.68	2.60	17.22	Gao, 2015 ^[12]
	-	-	-	-	139	8.89	0.33	83.63	0.25	6.91	Wu and Xie, 2017 ^[13]
	Zhejiang	2018	-	-	-	0.00	0.00	46.00	0.00	49.00	Wang et al, 2020 ^[14]
Shipping	PRD	-	Canister-GC-MS	16	52	0.63	0.00	91.60	0.00	7.56	Zhong et al, 2017 ^[8]
	PRD	-	Canister-GC-MA/FID	-	63	0.00	0.00	96.56	0.00	8.28	Gao, 2015 ^[12]
	China	-	-	4	212	9.75	0.43	82.99	0.00	0.00	Liang et al, 2020 ^[7]
	Zhejiang	-	-	-	-	0.00	0.00	56.00	0.00	44.00	Teng et al, 2022 ^[15]
	PRD	-	Canister-GC-MS, DNPH-HPLC	6	-	20.17	21.17	9.41	0.71	48.54	Wang et al, 2020 ^[16]
	PRD	-	Canister-GC-MS, DNPH-HPLC	6	-	13.47	15.25	6.06	2.00	63.22	Wang et al, 2020 ^[16]
	PRD	-	Canister-GC-MS, DNPH-HPLC	6	-	5.56	32.86	3.49	0.21	57.88	Wang et al, 2020 ^[16]

Plastic	PRD	-	Canister-GC-MS, DNPH-HPLC	6	-	9.91	24.31	5.70	1.71	58.37	Wang et al, 2020 ^[16]
	PRD	-	Canister-GC-MS	16	52	14.60	0.25	39.40	0.00	45.60	Zhong et al, 2017 ^[8]
	China	-	-	4	212	28.00	0.00	37.50	0.00	11.00	Liang et al, 2020 ^[7]
	Zheng- zhou	-	Bag-GC-MS	4	104	21.13	3.48	28.87	17.28	29.14	Zhang et al,2020 ^[11]

Table S4 The mass fraction of chemical groups of merged profiles for industrial solvent-used industry. (Unit: %)

Profile name	Alkanes	Alkenes	Aromatic	Halocarbons	OVOCs
Petrochemical industry	60.58	16.68	14.37	5.24	3.12
Gravure	19.88	6.69	7.73	5.33	58.69
Lithographic	32.32	5.18	13.61	6.67	39.77
Letterpress	13.36	1.56	10.45	12.03	29.62
Offset	32.88	2.23	17.91	1.73	34.39
Dyeing	3.09	0.18	39.06	1.10	56.88
Auto-coating	6.505	1.245	23.075	8.375	59.37
Auto-drying	3.975	4.84	62.515	4.3	24.17
Auto-repairing	7.01	0.1	54.77	0.01	38.18
Furniture	8.86	0.86	9.74	10.24	70.29
Metal	10.76	0.62	61.93	1.43	23.18
Shipping	9.91	18.80	43.98	1.16	41.12
Plastic	14.60	0.25	39.40	0.00	45.60
Electronic	24.56	1.74	33.18	8.64	20.07

Table S5 The mass fraction of chemical groups of original profiles for chemical industry. (Unit: %)

Profile name	Location	Data	Sampling and analysis methods	No. samples	No. species	Percentage of chemical groups					Reference
						alkanes	alkenes	aromatics	halocarbons	OVOCs	
ETH	-	-	-	-	139	21.09	37.09	15.43	8.16	17.52	Wu and Xie, 2017 ^[13]
PRO	-	-	-	-	139	21.09	37.09	15.43	8.16	17.52	Wu and Xie, 2017 ^[13]
BEN	-	-	-	-	139	0.00	0.00	100.00	0.00	0.00	Wu and Xie, 2017 ^[13]
EBEN	-	-	-	-	139	0.00	0.00	100.00	0.00	0.00	Wu and Xie, 2017 ^[13]
BUT	-	-	-	-	139	0.00	50.00	0.00	0.00	0.00	Wu and Xie, 2017 ^[13]
STY	-	-	-	-	139	0.00	0.00	100.00	0.00	0.00	Wu and Xie, 2017 ^[13]
PVC		2018–2019	Canister-GC-MS	148	107	11.32	0.00	0.00	0.00	88.68	Huang et al. 2021 ^[17]
PS		2018–2019	Canister-GC-MS	148	107	2.91	3.56	82.61	1.98	9.09	Huang et al. 2021 ^[17]
PPG	Jiangsu	-	Canister-GC-MS	6	7	0.10	0.26	7.31	14.43	77.88	Zhao et al. 2017 ^[18]
PP		2018–2019	Canister-GC-MS	148	107	32.98	19.77	8.70	15.81	22.93	Huang et al. 2021 ^[17]
PP	YRD	-	Canister-GC-MS/FID	25	61	15.96	56.48	5.09	22.46	0.00	Mo et al. 2015 ^[2]
PE		2018–2019	Canister-GC-MS	148	107	44.82	22.53	7.51	7.51	17.79	Huang et al. 2021 ^[17]
SIS	Jiangsu	-	Canister-GC-MS	6	12	85.79	0.00	1.00	1.03	12.12	Zhao et al. 2017 ^[18]
SEBS	Jiangsu	-	Canister-GC-MS	6	10	72.69	0.00	1.92	2.65	22.69	Zhao et al. 2017 ^[18]
SBR		2018–2019	Canister-GC-MS	148	107	49.72	1.19	49.02	0.00	0.00	Huang et al. 2021 ^[17]
SBR	Jiangsu	-	Canister-GC-MS	6	12	69.90	0.00	25.95	0.14	3.95	Zhao et al. 2017 ^[18]
ERP	-	2018–2019	Canister-GC-MS	148	107	21.63	28.86	10.68	2.77	36.36	Huang et al. 2021 ^[17]
EPDM	-	2018–2019	Canister-GC-MS	148	107	20.86	9.09	7.91	46.25	9.09	Huang et al. 2021 ^[17]
PU	-	2018–2019	Canister-GC-MS	148	107	9.36	1.58	34.39	22.14	32.41	Huang et al. 2021 ^[17]
PU	-	2019	Canister-GC-MS	4	106	3.00	0.00	40.14	4.86	52.11	Ma et al. 2020 ^[19]
PF		2018–2019	Canister-GC-MS	148	107	10.16	0.00	20.16	29.25	40.71	Huang et al. 2021 ^[17]
PF	-	-	Canister-GC-MS/FID	-	108	2.33	0.00	57.24	3.71	36.73	Zhang et al. 2021 ^[20]
PF	-	2019	Canister-GC-MS	4	106	4.01	0.00	96.45	0.00	0.00	Ma et al. 2020 ^[19]
PET	-	2019	Canister-GC-MS	4	106	2.92	0.98	5.18	3.24	87.06	Ma et al. 2020 ^[19]
PC	-	2019	Canister-GC-MS	4	106	24.23	2.92	0.00	71.85	1.31	Ma et al. 2020 ^[19]
PC		2018–2019	Canister-GC-MS	148	107	49.62	7.51	10.67	28.86	2.37	Huang et al. 2021 ^[17]
ER	-	2019	Canister-GC-MS	4	106	0.00	0.00	55.23	0.98	30.10	Ma et al. 2020 ^[19]
CR	-	2019	Canister-GC-MS	4	106	1.34	0.00	46.29	0.98	50.82	Ma et al. 2020 ^[19]
AR	-	2019	Canister-GC-MS	4	106	64.32	15.86	2.27	0.98	9.07	Ma et al. 2020 ^[19]
ABS	-	2019	Canister-GC-MS	4	106	1.14	12.96	74.44	1.95	9.71	Ma et al. 2020 ^[19]
ABS	YRD	-	Canister-GC-	25	61	17.48	5.56	55.56	21.76	0.00	Mo et al. 2015 ^[2]

FR	-	-	MS/FID Canister-GC- MS/FID	-	108	14.39	0.00	25.25	1.35	59.01	Zhang et al. 2021 ^[20]
SBP	Chengdu	-	Canister-GC-MS	22	37	0.00	0.00	45.31	0.00	19.83	Zhou et al, 2019 ^[21]
SBP	Chengdu	-	Canister-GC-MS	22	37	0.00	0.00	60.55	0.00	31.54	Zhou et al, 2019 ^[21]
SBP	East China	2017	Canister-GC-MS	12	106	0.00	0.00	81.80	1.50	12.01	Wu et al,2020 ^[22]
SBP	-	-	GC-MS	183		0.11	0.00	79.03	0.00	18.39	Ke et al, 2020 ^[23]
WBP	East China	2017	Canister-GC-MS	12	106	0.00	0.00	12.05	12.01	76.28	Wu et al,2020 ^[22]
WBP	-	-	GC-MS	183	-	3.78	0.00	6.11	0.00	85.42	Ke et al, 2020 ^[23]
UVP	-	-	GC-MS	183	-	1.38	0.00	2.49	0.00	96.14	Ke et al, 2020 ^[23]
WBI	-	-	GC-MS	183	-	2.05	0.00	5.61	0.00	89.21	Ke et al, 2020 ^[23]
WBI	China	-	-	4	212	5.00	0.00	6.50	0.00	63.00	Liang et al, 2020 ^[7]
UVI	-	-	GC-MS	183	-	1.83	0.00	0.00	0.00	46.47	Ke et al, 2020 ^[23]

Table S6 The mass fraction of chemical groups of merged profiles for chemical industry. (Unit: %)

Profile name	Alkanes	Alkenes	Aromatic	Halocarbons	OVOCs
ETH	21.24	37.35	15.54	8.22	17.65
BEN	0.00	0.00	100.00	0.00	0.00
EBEN	0.00	0.00	100.00	0.00	0.00
BUT	11.11	88.89	0.00	0.00	0.00
STY	0.00	0.00	100.00	0.00	0.00
PVC	11.32	0.00	0.00	88.68	0.00
PS	2.91	3.55	82.48	1.98	9.08
PPG	0.10	0.26	7.31	14.43	77.90
PP	21.94	34.17	6.18	17.16	20.55
PE	44.75	22.49	7.50	7.50	17.76
SISR	85.84	0.00	1.00	1.03	12.13
SEBSR	72.73	0.00	1.92	2.65	22.70
SBR	58.31	1.16	36.54	0.14	3.85
ERP	21.57	28.77	10.64	2.76	36.26
EPDM	22.38	9.76	8.48	49.62	9.76
PU	6.13	1.57	36.97	13.39	41.93
PF	4.63	0.00	48.84	13.89	32.63
PET	2.93	0.98	5.22	3.26	87.61
PC	35.16	4.97	10.16	47.95	1.75
ER	0.00	0.00	63.99	1.13	34.88
CR	1.34	0.00	46.56	0.98	51.11
AR	69.54	17.15	2.46	1.06	9.80
ABS	8.85	8.81	61.83	11.28	9.24
FR	14.39	0.00	25.25	1.35	59.01
SBP	0.12	0.00	75.14	1.69	23.04
WBP	3.58	0.00	8.59	11.36	76.47
UVP	1.38	0.00	2.49	0.00	96.13
WBI	4.11	0.00	7.07	0.00	88.82
UVI	3.79	0.00	0.00	0.00	96.21

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