Supporting Information

Recent Advances in the Catalytic Oxidation of Volatile Organic Compounds: A Review Based on Pollutant Sorts and Sources

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Table S1 Atmospheric reactivity of typical industrial VOC species.

VOC type	POCP[a]	YSOA[b]
Ethane	9	0
Propane	13	0
n-Butane	35.2	29.0
iso-Butane	91	0
n-Pentane	39.5	52.7
iso-Pentane	40.5	0.07
Cyclopentane	0	0.04
Cyclohexane	38	0.0017
n-hexane	32.3	0
Benzene	3	0.0093
Toluene	36	0.36
o-xylene	91	0.1
m-xylene	111	0.0069
p-xylene	88	0.0072
Naphthalene	0	0.3
Acetylene	6	0
Formaldehyde	67	0
Acetaldehyde	116	0
Acetone	9.4	9.8
Methyl ethyl ketone	37.3	7.1

Ethyl acetate	20.9	27.4
Methanol	11	0
Ethanol	34	0
2-Propanol	21	0
Dichloromethane	n.a.	1.064
Ethylene	100	0
Propene	160	0
1-Butene	102	0

[a] Photochemical ozone creation potential;[1-7] [b] Yield of secondary organic aerosol.[1,2,8-10]

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Table S2 Biotoxicity of typical VOC pollutants.

VOC type	CHQ[a]	CHGV[b]
n-Butane	＜0.01	10,000
iso-Butane	＜0.01	10,000
n-Pentane	＜0.01	8000
iso-Pentane	＜0.01	8000
Cyclopentane	＜0.01	120
Cyclohexane	＜0.01	1744
n-hexane	0.02	199
Benzene	0.11	9
Toluene	＜0.01	1328
o-xylene	＜0.01	23
m-xylene	0.03	23
p-xylene	0.03	23
Formaldehyde	0.51	n.a.
Acetaldehyde	0.38	n.a.
Ethylene	＜0.01	2500
1-Butene	＜0.01	2300

[a] Chronic hazard quotient;[1-3] [b] Chronic health guideline value.[1]

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Table S3 Physicochemical and thermodynamic properties of typical industrial VOCs.

VOC type	Formula	ΔG_f[a] (kJ/mol)	ΔH_f[b] (kJ/mol)	B_p[c] (°C)	S_{vp}[d] (kPa)
Ethane	C_2H_6	-32.9	-84.7	-88.5	3845.3 (21.1 °C)
Propane	C_3H_8	-23.4	-103.8	-42.2–42.0	853.2 (21.1 °C)
n-Butane	C_4H_{10}	-124.7	-15.7	-1–1	170 (10 °C)
iso-Butane	C_4H_{10}	-21.4	-134.2	-11.7	204.8 (21 °C)
n-Pentane	C_5H_{12}	-8.6	-146.9	35.9–36.3	57.9 (20 °C)
iso-Pentane	C_5H_{12}	-13.5	-153.6	27.8–28.2	77 (20 °C)
Cyclopentane	C_5H_{10}	39	-76.4	49.2	53.3 (31 °C)
Cyclohexane	C_6H_{12}	32.1	-123.4	80.74	10.4 (20 °C)
n-hexane	C_6H_{14}	-4.0	-198.8	68.5–69.1	17.6 (20 °C)
Benzene	C_6H_6	124.5	49	80.1	12.7 (25 °C)
Toluene	C_7H_8	114.1	12	111	2.8 (20 °C)
o-xylene	C_8H_{10}	110.8	-24.4	144.4	0.9 (20 °C)
m-xylene	C_8H_{10}	118.9	17.3	139	1.2 (20 °C)
p-xylene	C_8H_{10}	121.5	18.1	138.4	1.2 (20 °C)
Naphthalene	$C_{10}H_8$	224	150.6	218	0.1 (52.6 °C)
Acetylene	C_2H_2	209.2	226.7	-84	4478.6 (20 °C)
Formaldehyde	CH_2O	-109.9	-115.9	-19.4	13.3 (-57.3 °C)
Acetaldehyde	C_2H_4O	-133.2	-166.4	20.2	98.7 (20 °C)
Acetone	C_3H_6O	-155.3	-248.1	56.1	30.6 (25 °C)

Methyl ethyl ketone	C_4H_8O	-146.6	-238.7	79.6	10.4 (20 °C)
Ethyl acetate	$C_4H_8O_2$	-326.9	-443.1	77.1	9.7 (20 °C)
Methanol	CH_4O	-166.6	-239.2	64.7	13 (20 °C)
Ethanol	C_2H_6O	-174.8	-277.6	78.2	5.9 (20 °C)
2-Propanol	C_3H_8O	-173.6	-272.6	82.6	9.2（80 °C）
Dichloromethane	CH_2Cl_2	-68.9	-95.5	39.6	57.3 (25 °C)
1,2-Dichloroethane	$C_2H_4Cl_2$	-73.9	-129	84	13.3 (29 °C)
Vinyl chloride	C_2H_3Cl	41.1	28.5	-13.4	344 (20 °C)
Tricholoroethylene	C_2HCl_3	6.7	-19.1	87.1	13.3 (32 °C)
Chlorobenzene	C_6H_5Cl	99.3	52	131	1.3 (20 °C)
1,2-Dichlorobenzene	$C_6H_4Cl_2$	83	30.2	180.4	2.4 (86 °C)
Ethylene	C_2H_4	68.4	52.5	-103.7	11.6 (25 °C)
Propene	C_3H_6	62.5	20	-47.6	1158 (25 °C)
1-Butene	C_4H_8	72	1.2	-6.47	299. 3 (25 °C)
Acetonitrile	C_2H_3N	91.8	51.5	81.3–82.1	9.7 (20 C)
Ethylenediamine	$C_2H_8N_2$	-8.5	-26.6	116	1.3 (20 °C)
Acrylonitrile	C_3H_3N	193.7	183.7	77	11.2 (20 °C)

[a] Standard Gibbs free energy of formation;[1,2] [b] Standard molar enthalpy of formation;[1,2] [c] Boiling point; [3] [d] Saturated vapor pressure.[3]

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