Supplementary material

Potential new tracers and their relative emission factors for burning household waste in stoves

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Table S1. The retention indices of the identified tracer compounds.

	Retention time	Kovats RI	Lee RI	References	
				Kovats RI	Lee RI
o-Terphenyl (o-TPH)	27.86	1888.3	316.5		317.42 (Marynowski et al. 2004), 317.9 (Li et al. 2016)
m-Terphenyl (m-TPH)	32.15	2157.7	357.6		356.74 (Marynowski et al. 2004), 356.95 (Li et al. 2016)
p-Terpheny (p-TPH)*	32.74	2196.3	363.2		362.4 (Marynowski et al. 2004), 362.8 (Li et al. 2016)
1,3,5-Triphenylbenzene (135-TPB)*	42.32	2944.4	463.7	3007 (Simoneit et al., 2005)	463.4 (Li et al. 2016)
1,2,4-Triphenylbenzene (124-TPB)*	39.38	2691.9	431.1	2630 (Simoneit et al., 2005), 2741, estimated with error: 55 (http://www.chemspider.com/Chemical-Structure.452244.html (ref. to NIST))	
m,p-Quaterphenyl (m,p-QTPH)	43.48	3049.3	476.5		476.3 (https://pubchem.ncbi.nlm.nih.gov/compound/1166-19-4)
p-Quaterphenyl (p-QTPH)*	43.99	3095.7	482.2		482.98 (Li et al. 2016)
2-(Benzoyloxy)ethyl vinyl terephthalate (2-BEVT)	38.43	2615.7	420.6	2636 (Tsuge et al. 2011)	
2,4,6-Triphenyl-1-hexen (SSS)*	36.21	2444.0	396.5	2484 (Tsuge et al. 2011)	
2-Methylene-4-phenylheptanedinitrile (ASA)	26.72	1822.6	305.6	1843 (Tsuge et al. 2011)	
2-Methylene-4,6-diphenylhexanenitrile (ASS)	31.31	2101.5	349.6	2129 (Tsuge et al. 2011)	
4,6-Diphenylhept-6-enenitrile (SSA)	31.95	2144.7	355.7	2175 (Tsuge et al. 2011)	
2-Phenethyl-4-phenylpent-4-enenitrile (SAS)	32.35	2171.0	359.5	2200 (Tsuge et al. 2011)	

* The retention behaviour was studied with authentic standards

References

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Simoneit, B. R. T., Medeiros, P. M., and Didyk, B. M.: Combustion products of plastics as indicators for refuse burning in the atmosphere, Environmental Science & Technology, 39, 6961-6970, 10.1021/es050767x, 2005.

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Table S2. The absolute emission factors (mg kg^{-1}) and the relative emission factors (µg g^{-1} PM^{-1}) of the identified tracer compound for waste burning. The values in parentheses are the relative standard deviation (%) obtained for a given type of waste under different burning conditions.

		135-TPB	o-TPH	m-TPH	p-TPH	m,p-QTPH	p-QTPH	2-BEVT	124-TPB	SSS	ASA	ASS	SSA	SAS	Melamine
Emission Factor (mg kg^{-1})	ABS	2.1 (75)	1.5 (39)	21 (48)	8.7 (44)	0.27 (69)	<LOQ	<LOQ	0.93 (76)	<LOQ	9.2 (130)	2.2 (104)	1.4 (95)	4.2 (115)	-
	LDF	0.060 (111)	0.0067 (15)	0.057 (224)	<LOQ	<LOQ	<LOQ	<LOQ	0.0062 (94)	1.1 (161)	1.7 (223)	0.67 (222)	0.60 (222)	1.2 (222)	51 (81)
	OSB	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ
	PAP	0.16 (75)	<LOQ	0.62 (105)	<LOQ	0.0061 (141)	<LOQ	<LOQ	0.022 (87)	0.83 (104)	0.041 (47)	0.11 (110)	0.036 (118)	0.040 (104)	<LOQ
	PE	<LOQ	<LOQ	0.42 (173)	<LOQ	<LOQ	<LOQ	<LOQ	0.011 (173)	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	-
	PET	1.1 (50)	2.1 (37)	61 (46)	87 (50)	10 (51)	6.7 (53)	2.8 (199)	4.4 (49)	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ
	PP	0.026 (173)	0.090 (109)	1.6 (9)	<LOQ	<LOQ	<LOQ	<LOQ	0.011 (173)	0.13 (173)*	<LOQ	<LOQ	<LOQ	<LOQ	-
	PS	40 (117)	3.0 (107)	57 (37)	35 (26)	1.9 (50)	0.55 (69)	0.012 (224)*	9.8 (49)	150 (206)	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ
	PU	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	-
	PVC	0.17 (105)	0.28 (71)	2.1 (36)	0.57 (173)	0.052 (93)	<LOQ	<LOQ	<LOQ	1.5 (150)*	0.28 (173)*	<LOQ	<LOQ	<LOQ	<LOQ
	RAG	0.13 (51)	0.12 (40)	5.3 (51)	8.0 (52)	0.86 (58)	0.58 (68)	0.060 (117)	0.68 (64)	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ
	TIRE	<LOQ	0.044 (173)	0.63 (173)	<LOQ	<LOQ	0.011 (173)	<LOQ	0.033 (173)	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	-
	WOOD	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ
Relative emission factor (µg g^{-1} PM^{-1})	ABS	24 (41)	18 (13)	250 (18)	100 (14)	3.2 (35)	<LOQ	<LOQ	10 (43)	<LOQ	90 (116)	22 (90)	15 (87)	43 (100)	-
	LDF	23 (116)	1.9 (224)	11 (224)	<LOQ	<LOQ	<LOQ	<LOQ	2.2 (108)	380 (160)	500 (222)	200 (221)	180 (222)	350 (221)	19000 (79)
	OSB	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ
	PAP	75 (79)	<LOQ	290 (107)	<LOQ	2.9 (141)	<LOQ	<LOQ	10.0 (90)	380 (106)	19 (51)	51 (112)	17 (119)	18 (106)	<LOQ
	PE	<LOQ	<LOQ	17 (173)	<LOQ	<LOQ	<LOQ	<LOQ	0.43 (173)	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	-
	PET	100 (41)	190 (26)	5400 (37)	7700 (43)	920 (44)	590 (50)	250 (199)	390 (44)	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ
	PP	0.49 (173)	3.8 (105)	57 (37)	<LOQ	<LOQ	<LOQ	<LOQ	0.21 (173)	5.3 (173)*	<LOQ	<LOQ	<LOQ	<LOQ	-
	PS	800 (116)	56 (98)	1100 (40)	690 (29)	34 (17)	9.7 (33)	0.24 (224)*	190 (52)	2900 (208)	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ
	PU	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	-
	PVC	6.2 (121)	9.6 (96)	67 (69)	24 (173)	1.9 (108)	<LOQ	<LOQ	<LOQ	59 (157)*	11 (173)*	<LOQ	<LOQ	<LOQ	<LOQ
	RAG	15 (51)	14 (41)	610 (52)	920 (52)	100 (58)	67 (68)	6.9 (117)	78 (63)	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ
	TIRE	<LOQ	1.1 (173)	15 (173)	<LOQ	<LOQ	0.26 (173)	<LOQ	0.79 (173)	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	-
	WOOD	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ

* Possible contamination