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# Development of a House Dust Standard Reference Material for the Determination of Organic Contaminants

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1       **Development of a House Dust Standard Reference Material for the Determination of**  
2       **Organic Contaminants: Supporting Information**

3  
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16  
17   *Dust Collection (1):* The dust used for the preparation SRM 2585 was taken from vacuum  
18   cleaner bags collected from homes, cleaning services, motels, and hotels in the states of North  
19   Carolina, Maryland, Ohio, New Jersey, Montana, and Wisconsin during 1993 and 1994. The  
20   material was collected at the same time and from the same locations as the dust used for the  
21   preparation of SRM 2583 Trace Elements in Indoor Dust, Nominal 90 mg/kg Lead (2) and SRM  
22   2584 Trace Elements in Indoor Dust, Nominal 1 % Lead (3).

23   *Sample Preparation (1):* The vacuum cleaner bags were first sterilized by gamma irradiation,  
24   receiving a minimum total dose of 2.5 mrad. For the low lead material, SRM 2583, the contents  
25   of each vacuum cleaner bag was passed through a coarse screen (2 mm hole size) to remove  
26   cotton and debris. Then using a vibrating stainless steel sieve apparatus, the resultant material  
27   was screened in two successive steps, first through a 250 µm sieve and then a 100 µm sieve. For  
28   the high lead material, SRM 2584, the raw material from each bag was mixed and tumbled in a  
29   modified food processor using chopping blades and a compressed air jet. While still tumbling,  
30   the dust was separated from unwanted debris by vacuuming through a series of screens into a  
31   clean HEPA vacuum cleaner. The dust collected in this manner was then screened through a 90

32     $\mu\text{m}$  stainless steel sieve using vibration and a vacuum. Processed sublots of approximately 5 kg  
33    each were set aside and analyzed for lead by X-ray fluorescence to develop a blending protocol  
34    for the target lead concentrations in SRM 2584. SRM 2585 was prepared from approximately 70  
35    % of the material found to have 90 mg/kg nominal lead levels used for SRM 2583 and 30 % of  
36    the material that had the high lead content used for SRM 2584. The selected sublots were  
37    blended in a cone blender and then bottled (approximately 10 g of dust per bottle) as SRM 2585.  
38    *Moisture content.* The moisture content of the dust was determined by measuring the mass loss  
39    after freeze drying. Six bottles of SRM 2585 were selected according to a stratified  
40    randomization scheme for the drying study. Approximately 1 g from each glass bottle was  
41    transferred to a glass weighing vial and dried for seven days at 1 Pa with 5 °C shelf temperature  
42    and a – 46.9 °C condenser temperature. The moisture content in SRM 2585 at the time of the  
43    certification analyses was  $2.11\% \pm 0.06\%$  (95% confidence level). Analytical results for the  
44    organic constituents were determined on an as received mass fraction basis and then converted to  
45    a dry-mass fraction basis by dividing by the conversion factor of 0.9789 (gram dry mass per  
46    gram wet mass).  
47    *Homogeneity assessment.* When assessing homogeneity, the goal is to minimize and know the  
48    contribution of the measurement component to the overall uncertainty so that the subsampling  
49    component to the overall uncertainty can be assessed. The measurement component to the  
50    overall uncertainty has been well characterized for the methods chosen for the homogeneity  
51    assessment of SRM 2585 for PAHs and PCBs (see below), based on the development and of a  
52    wide range of environmental reference materials for the determination of organic contaminants  
53    (4).  
54    *Homogeneity assessment for PAH.* The homogeneity of SRM 2585 was assessed by analyzing

duplicate samples of approximately 1 g from six bottles selected by stratified random sampling. Samples were extracted, processed, and analyzed as described below for GC/MS (IIIa and IIIb). No statistically significant differences among bottles were observed for the PAHs at this sample size.

*Homogeneity assessment for PCBs and chlorinated pesticides.* The homogeneity of SRM 2585 was assessed by analyzing duplicate samples of approximately 1 g from six bottles selected by stratified random sampling. Samples were extracted, processed, and analyzed as described below for GC/MS (II). No statistically significant differences among bottles were observed for the chlorinated analytes at this sample size.

*Determination of PAHs in SRM 2585 Organic Contaminants in House Dust using multiple methods.* Seven sets of GC/MS results, designated as GC/MS (Ia), (Ib), (IIa), (IIb), (IIIa), (IIIb), and (IV), were obtained (SI Figure 1, SI Table 2). For GC/MS (I [a and b] and II [a and b]) analyses, one subsample of approximately 1 g from six bottles of SRM 2585 (six bottles for method I and six bottles for method II) was extracted using pressurized fluid extraction (PFE) with methylene chloride. The concentrated extract was passed through a silica solid-phase extraction (SPE) cartridge and eluted with 2% methylene chloride in hexane (volume fraction). The processed extract was then analyzed by GC/MS using a 0.25 mm i.d. x 60 m fused silica capillary column with 50% (mole fraction) phenyl-substituted methylpolysiloxane phase (0.25 µm film thickness, DB-17MS, J&W Scientific, Folsom, CA). This method is designated as GC/MS (Ia) and GC/MS (IIa). For GC/MS (Ib) and GC/MS (IIb), the same extracts were analyzed by GC/MS using a 0.25 mm i.d. x 15 m fused silica capillary column with dimethyl 50% (mole fraction) liquid crystalline polysiloxane phase (0.25 µm film thickness, LC-50, J&K Environmental, Sydney, Nova Scotia, Canada). The GC/MS (III [a and b]) analyses were

performed using duplicate subsamples of approximately 1 g from six bottles of SRM 2585. These samples were Soxhlet extracted for 18 h with 250 mL of 50% hexane and 50% acetone (volume fraction). The concentrated extract was passed through an aminopropyl SPE cartridge and eluted with 10% methylene chloride in hexane. The fractions were concentrated, and the SPE step was repeated. GC/MS analysis was performed using 0.25 mm i.d. x 60 m fused silica capillary column with a relatively non-polar proprietary phase (0.25  $\mu$ m film thickness, DB-XLB, J&W Scientific, Folsom, CA) for method GC/MS (IIIa) and a 50% phenyl-substituted methylpolysiloxane phase (0.25  $\mu$ m film thickness, DB-17 MS) for method GC/MS (IIIb). For the GC/MS (IV) analyses, approximately 1 g subsamples from six bottles of SRM 2585 were extracted using PFE with methylene chloride. The concentrated extract was passed through an alumina cartridge and eluted with 9 mL of 35% methylene chloride in hexane. The processed extract was then analyzed by GC/MS using a 0.25 mm i.d. x 60 m fused silica capillary column with 50% (mole fraction) phenyl-substituted methylpolysiloxane phase (0.25  $\mu$ m film thickness, DB-17MS, J&W Scientific, Folsom, CA). For the GC/MS measurements described above, selected perdeuterated PAHs were added to the dust prior to solvent extraction for use as internal standards for quantification purposes.

Values presented in SI Table 2 were used to generate either certified or reference concentrations for SRM 2585. Certified and references concentrations are presented in the main text in Tables 1 and 2, and are also listed below in SI Table 2. A NIST certified value is a value for which NIST has the highest confidence in its accuracy and that all known or suspected sources of bias have been investigated or accounted for by NIST. Reference values are noncertified values that are the best estimate of the true value. However, the values do not meet the NIST criteria for certification and are provided with associated uncertainties that may reflect only measurement

precision, may not include all sources of uncertainty, or may reflect a lack of sufficient statistical agreement among multiple analytical methods. The approach used to calculate each value and uncertainty is described in SI Table 2.

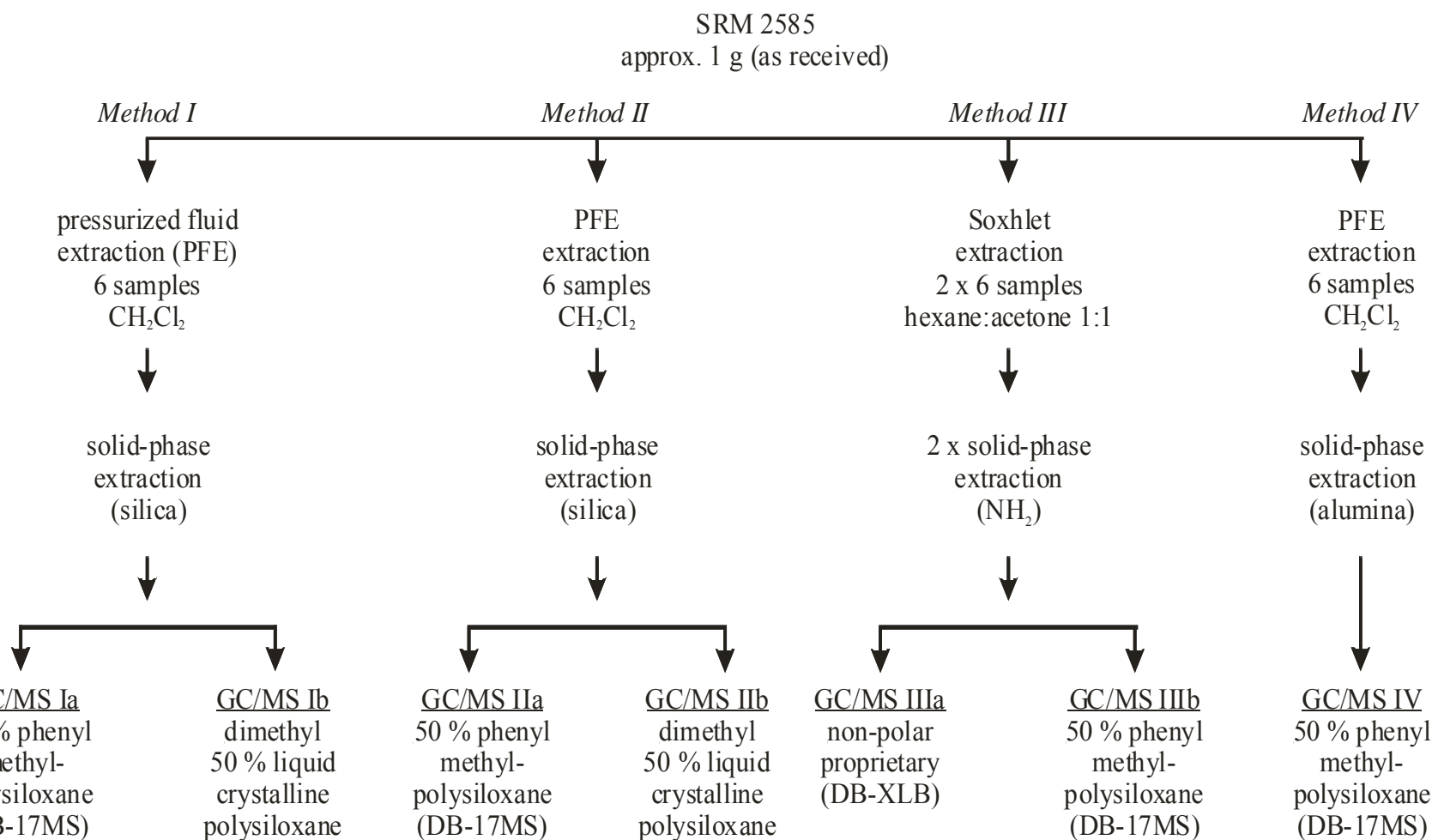
*Determination of PCBs and chlorinated pesticides in SRM 2585 Organic Contaminants in House*

*Dust using multiple methods.* Four sets of results were obtained for SRM 2585 designated as GC-ECD (I), GC/MS (I), GC/MS (II), and GC/MS (III) (SI Figure 2, SI Table 3). For GC-ECD (I) and GC/MS (I), subsamples of approximately 1 g from six bottles of SRM 2585 were extracted using PFE with methylene chloride. The concentrated extract was fractionated by LC on a semi-preparative aminopropylsilane column to isolate two fractions containing (1) the PCB congeners and lower polarity pesticides using hexane as the mobile phase and (2) the more polar pesticides using 25% methylene chloride in hexane as the mobile phase. Each concentrated fraction was passed through a silica SPE cartridge with 25% methylene chloride in hexane, concentrated, and then analyzed by GC-ECD and by GC/MS both using a 0.25 mm i.d. x 60 m fused silica capillary column with a relatively non-polar proprietary phase (0.25 µm film thickness, DB-XLB). PCBs 30 and 103, and perdeuterated 4,4'-DDT were added prior to extraction for use as internal standards for quantification purposes. For GC/MS (II), duplicate subsamples of approximately 1 g from six bottles of SRM 2585 were Soxhlet extracted for 18 h with 250 mL of 50% hexane and 50% acetone (volume fraction). The concentrated extract was passed through an aminopropyl SPE cartridge and eluted with 10% methylene chloride in hexane. The fractions were concentrated, and the SPE step was repeated. GC/MS analysis was performed using 0.25 mm i.d. x 60 m fused silica capillary column with a 50% phenyl-substituted methylpolysiloxane phase (0.25 µm film thickness, DB-17 MS). For the GC/MS (II) analyses, selected <sup>13</sup>C-labeled PCB congeners and chlorinated pesticides were added to the dust

prior to extraction for use as internal standards for quantification purposes. For the GC/MS (III) analyses, approximately 1 g subsamples from six bottles of SRM 2585 were extracted using PFE with methylene chloride. The concentrated extract was passed through an alumina cartridge and eluted with 9 mL of 35% methylene chloride in hexane. The processed extract was then analyzed by GC/MS using a 0.25 mm i.d. x 60 m fused silica capillary column with 5% (mole fraction) phenyl-substituted methylpolysiloxane phase (0.25 µm film thickness, DB-5MS, J&W Scientific, Folsom, CA). Electron impact mass spectrometry was used for all of the analytes except for the chlordanes and nonachlors, which were quantified using negative chemical ionization for GC/MS (III). For the GC/MS (III) analyses, selected <sup>13</sup>C-labeled PCB congeners, <sup>13</sup>C-labeled *trans*-chlordane, and selected deuterated pesticides were added to the dust prior to extraction for use as internal standards for quantification purposes.

Values presented in SI Table 3 were used to generate either certified or reference concentrations for SRM 2585. Certified and reference concentrations are presented in the main text in Table 3, and are also listed below in SI Table 3. The definition of a certified or reference values is presented above. The approach used to calculate each value and uncertainty is described in SI Table 3.

**Disclaimer:** Certain commercial equipment, instruments, or materials are identified in this paper to specify adequately the experimental procedure. Such identification does not imply recommendation or endorsement by the National Institute of Standards and Technology, nor does it imply that the materials or equipment identified are necessarily the best available for the purpose.



SI Figure 1. Analytical scheme for the determination of polycyclic aromatic hydrocarbons (PAHs) in SRM 2585 Organic Contaminants in House Dust.



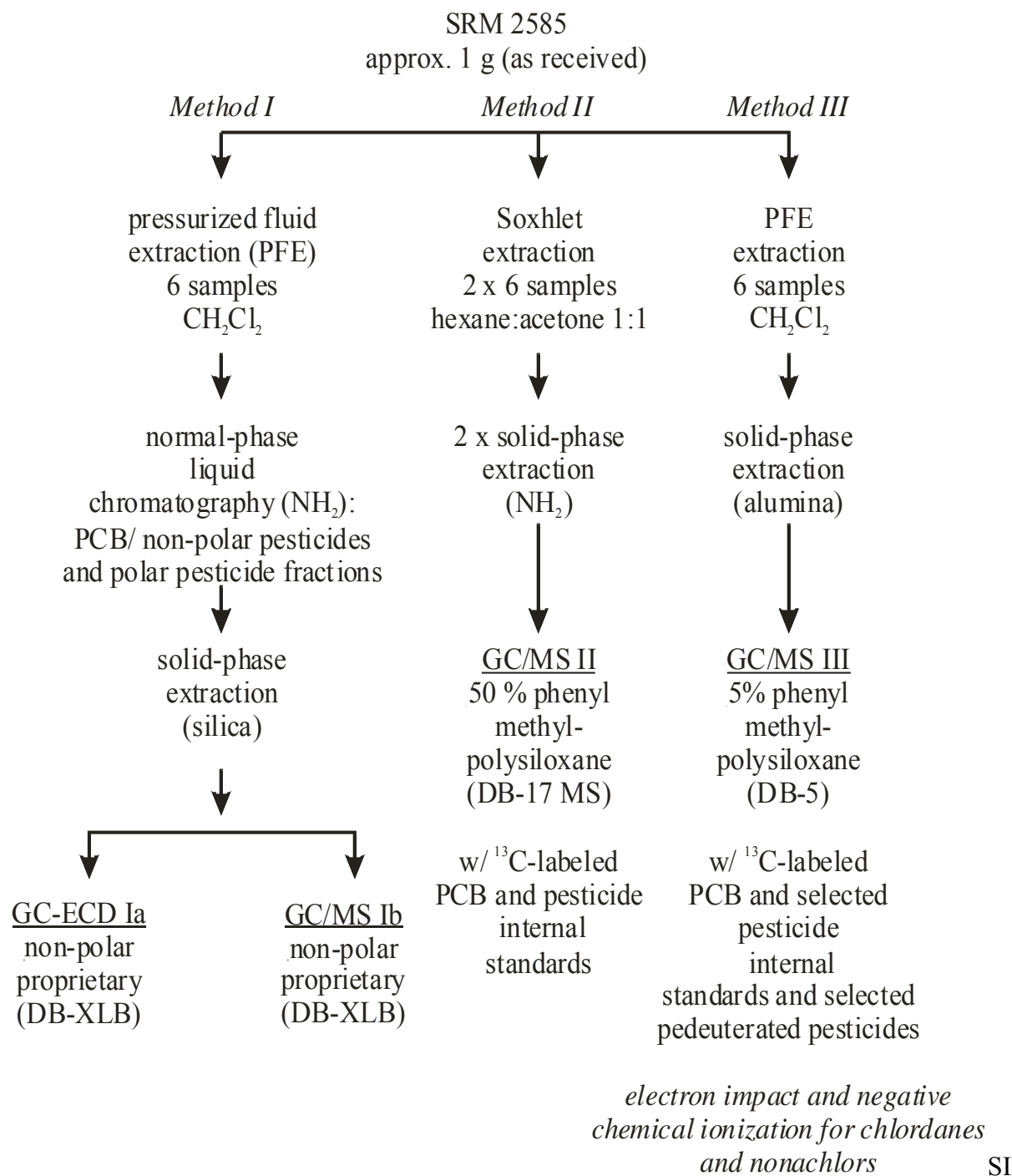
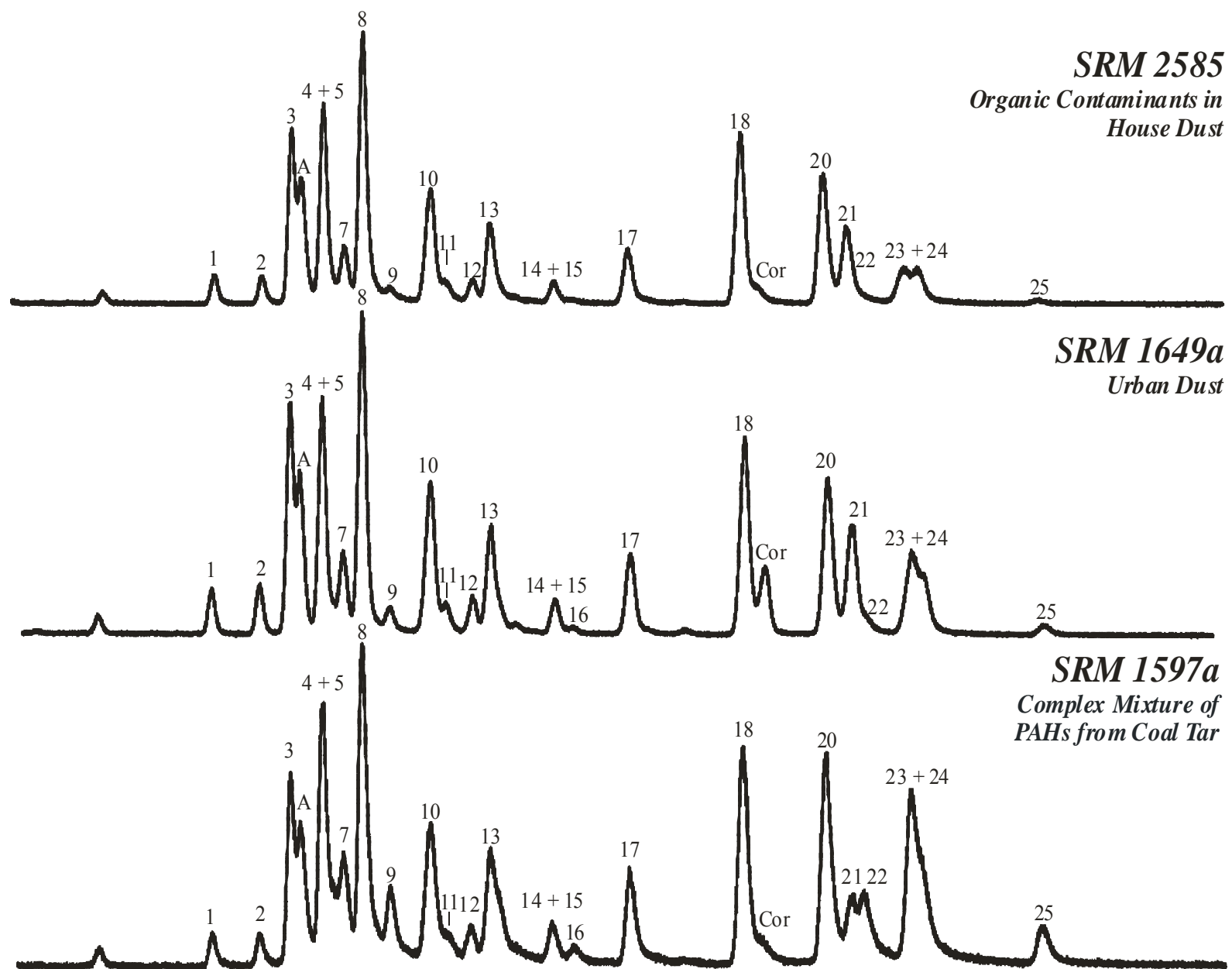
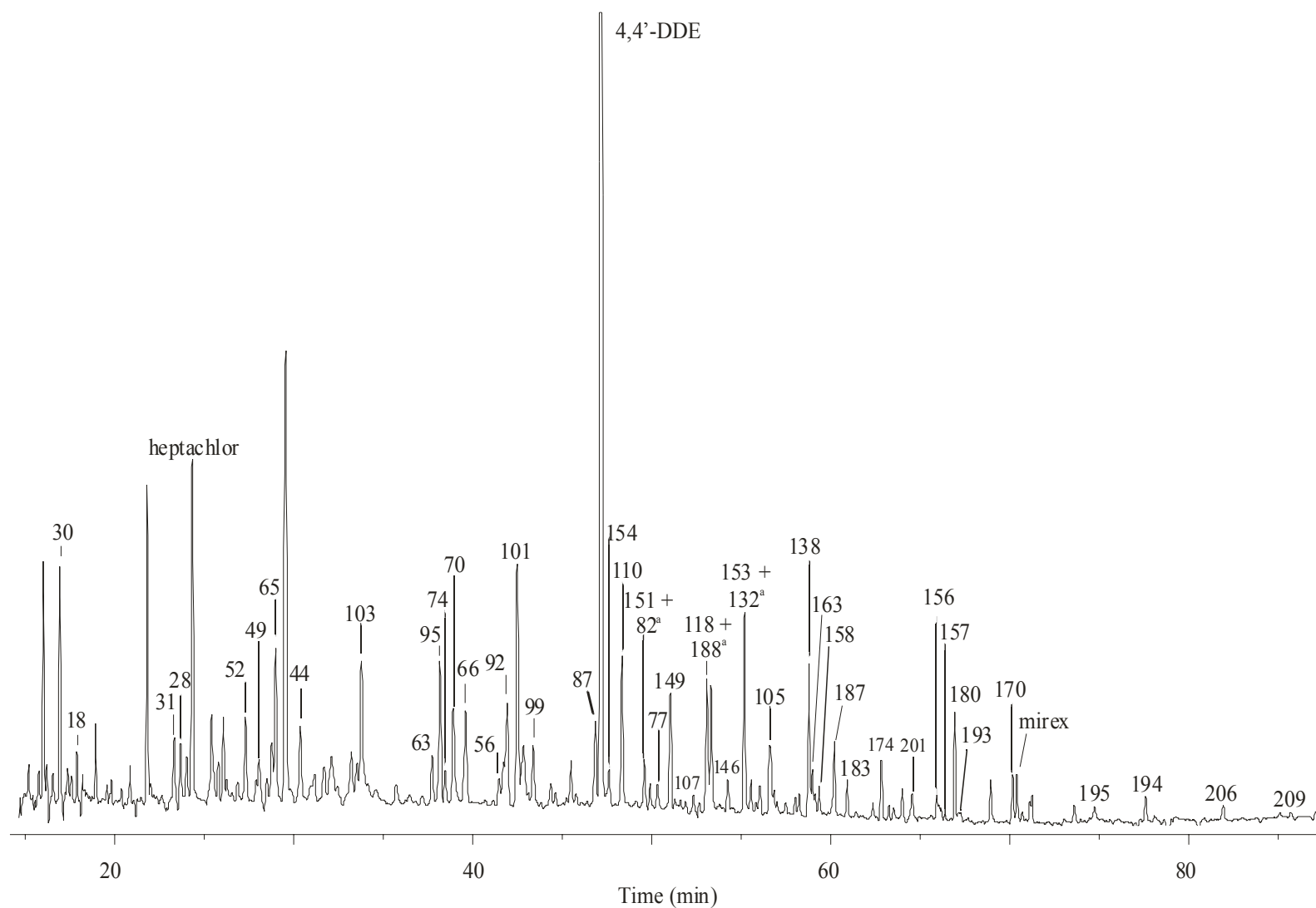


Figure 2. Analytical scheme for the determination of PCB congeners and chlorinated pesticides in SRM 2585 Organic Contaminants in House Dust.



SI Figure 3. Comparison of GC/MS single ion chromatograms for PAHs with molecular mass 302 for three environmental SRMs on a 50% phenyl methylpolysiloxane stationary phase. Peak numbers are identified in Regular Text Tables 1 and 2.



SI Figure 4. GC-ECD analysis of the PCB and lower polarity pesticide fraction isolated from SRM 2585 Organic Contaminants in House Dust using liquid chromatography equipped with a semi-preparative aminopropyl column. GC analysis conducted using a relatively non-polar stationary phase (DB-XLB, 60 m x 0.25 mm x 0.25  $\mu$ m film thickness). <sup>a</sup>coeluting compounds

SI Table 1. Reports on the use of air particulate SRMs and a coal tar SRM in genotoxicity and/or mutagenicity studies

<u>Authors and References</u>	<u>Use of SRMs</u>
Chauhan et al. (5)	Assessed the in-vitro toxicity of various particles, including urban particulate matter (SRMs 1648 and 1649), fine particulate matter (PM <sub>2.5</sub> ), titanium dioxide (SRM 154b), and respirable cristobalite (SRM 1879), on three murine macrophage cell lines.
Karlsson et al. (6)	Investigated the genotoxicity of PM in relation to particle-cell interactions using urban particulate matter (SRM 1649).
Prahalad et al. (7)	Investigated DNA oxidation using SRM 1649 as one source of particles.
Ball et al. (8)	Review of work on use of SRMs 1648 and 1649 in biological effects studies related to iron and reactive oxygen species.
Veranth et al. (9)	Comparison of results obtained with surrogate particles used to study the ability of inhalable particles to produce abnormal concentrations of intracellular iron to previous work with urban particulate standard reference materials (SRMs 1648 and 1649).
Smith et al. (10)	Investigated if iron associated with urban particulates could be mobilized by human lung epithelial cells using SRMs 1648 and 1649.
Vincent et al. (11)	Investigated the genotoxicity of PM in relation to particle-cell interactions using urban particulate matter (SRMs 1648 and 1649).
May et al. (12)	Review of chemical and biological studies of SRMs 1597, 1649, and 1650.
Lewtas et al. (13)	Overview of international collaborative study of the mutagenicity of complex environmental mixtures (SRMs 1597, 1649, and 1650) in the Ames <i>Salmonella typhimurium</i> mutation assay.
Marvin et al. (14, 15)	Used thia-arene and PAH profiles of SRMs 1597, 1649, and 1650 (diesel) as source sample data in a source apportionment study of genotoxic contamination in a harbor.
Marston et al. (16)	Investigated the effect of complex PAH mixtures on the activation of carcinogenic PAH to DNA-binding derivatives and carcinogenesis in mice treated topically with SRM 1597 and either additional benzo[a]pyrene or dibenzo[a,l]pyrene.
Mahadevan et al. (17)	Investigated the effects of PAHs with different carcinogenic potential in complex mixtures, and the metabolic activation of noncarcinogenic and weakly carcinogenic PAHs to DNA-binding derivatives using artificial mixtures that contained the same relative ratios of noncarcinogenic/weakly carcinogenic PAHs in SRMs 1597, 1649, and 1650.
Mahadevan et al. (18)	Investigated the PAH-DNA adduct formation in the human mammary carcinoma-derived cell line MCF-7 by examining the effects of SRM 1597 on the metabolic activation to DNA binding derivatives.

SI Table 2. Summary of analytical results (mass fractions in  $\mu\text{g kg}^{-1}$  as received)<sup>a</sup> for the determination of PAHs in SRM 2585 Organic Contaminants in House Dust

		<u>Method I<sup>b</sup></u>		<u>Method II</u>		<u>Method III</u>		<u>Method IV</u>	% Diff. <sup>d</sup>
		<u>Method Ia</u>	<u>Method Ib</u>	<u>Method II a</u>	<u>Method II b</u>	<u>Method IIIa</u>	<u>Method IIIb</u>		
<i>GC column<sup>b</sup>:</i>	<b>COA Value<sup>c</sup></b>	DB-17 MS	liquid crystalline	DB-17 MS	liquid crystalline	DB-XLB	DB-17 MS	DB-17 MS	
	<b>Certified Values</b>								
naphthalene	266 ± 8 <sup>e</sup>	259 (10) <sup>g</sup>	-- <sup>h</sup>	--	--	264 (19)	--	257 (18)	50
dibenzothiophene	109 ± 8 <sup>f</sup>	108 (4)	--	114 (4)	--	112 (7)	--	94 (3)	17
phenanthrene	1920 ± 20 <sup>f</sup>	1873 (68)	1884 (62)	2013 (96)	1930 (120)	1882 (31)	--	1841 (62)	9
anthracene	96.0 ± 5.2 <sup>f</sup>	94 (3)	85 (8)	96 (8)	87 (9)	95 (4)	--	106 (7)	20
4H-cyclopenta- [def]phenanthrene	117 ± 10 <sup>f</sup>	97 (4)	--	120 (6)	--	121 (8)	--	120 (3)	20
3-methyl- phenanthrene	293 ± 36 <sup>f</sup>	-- <sup>d</sup>	--	301 (43)	342 (33)	246 (16)	--	267 (6)	28
2-methyl- phenanthrene	352 ± 40 <sup>e</sup>	--	--	384 (35)	--	318 (9)	--	331 (10)	17
9-methyl- phenanthrene	205 ± 16 <sup>f</sup>	--	--	217 (20)	222 (32)	181 (10)	--	195 (6)	18
1-methyl- phenanthrene	197 ± 29 <sup>e</sup>	--	--	220 (17)	--	171 (9)	--	188 (3)	22
fluoranthene	4380 ± 100 <sup>f</sup>	4110 (160)	4260 (220)	4360 (100)	4410 (150)	4408 (107)	--	4153 (126)	7
pyrene	3290 ± 30 <sup>f</sup>	3160 (130)	3280 (160)	3257 (80)	3220 (140)	3229 (85)	--	3161 (73)	4
benzo[ghi]- fluoranthene	317 ± 11 <sup>f</sup>	310 (13)	291 (15)	332 (9)	310 (30)	307 (8)	--	309 (10)	12
benzo[c]- phenanthrene	288 ± 10 <sup>f</sup>	279 (12)	279 (18)	297 (11)	296 (20)	264 (12)	--	284 (10)	11
benz[a]- anthracene	1160 ± 54 <sup>f</sup>	1113 (48)	1122 (59)	1156 (23)	1159 (27)	1236 (29)	--	1025 (33)	17
chrysene	2260 ± 60 <sup>e</sup>	--	2200 (110)	--	2262 (53)	2174 (39)	--	--	4

		<u>Method I<sup>b</sup></u>		<u>Method II</u>		<u>Method III</u>		<u>Method IV</u>	% Diff. <sup>d</sup>
		<u>Method Ia</u>	<u>Method Ib</u>	<u>Method II a</u>	<u>Method II b</u>	<u>Method IIIa</u>	<u>Method IIIb</u>		
<i>GC column<sup>b</sup>:</i>	<i>COA Value<sup>c</sup></i>	DB-17 MS	liquid crystalline	DB-17 MS	liquid crystalline	DB-XLB	DB-17 MS	DB-17 MS	
triphenylene	589 ± 17 <sup>e</sup>	--	580 (34)	--	588 (10)	564 (22)	--	--	4
benzo[ <i>b</i> ]- fluoranthene	2700 ± 90 <sup>f</sup>	2500 (120)	2520 (160)	2990 (320)	2670 (220)	--	2692 (75)	2737 (185)	16
benzo[ <i>j</i> ]- fluoranthene	1320 ± 110 <sup>f</sup>	1134 (63)	--	1390 (150)	--	--	1201 (57)	1313 (81)	21
benzo[ <i>k</i> ]- fluoranthene	1330 ± 70 <sup>f</sup>	1208 (64)	1232 (72)	1430 (150)	--	--	1305 (28)	1298 (65)	16
benzo[ <i>a</i> ]- fluoranthene	74.5 ± 8.1 <sup>f</sup>	66 (4)	--	90 (12)	--	--	68 (3)	73 (4)	27
benzo[ <i>e</i> ]pyrene	2160 ± 80 <sup>f</sup>	1990 (100)	2080 (120)	2390 (250)	2190 (120)	--	2066 (56)	2192 (125)	17
benzo[ <i>a</i> ]pyrene	1140 ± 10 <sup>f</sup>	1065 (57)	1119 (65)	1180 (120)	1120 (29)	--	1101 (54)	1122 (66)	10
perylene	387 ± 23 <sup>f</sup>	387 (18)	363 (27)	421 (27)	417 (56)	--	362 (18)	343 (21)	19
benzo[ <i>ghi</i> ]- perylene	2280 ± 40 <sup>f</sup>	2170 (110)	2160 (120)	2262 (55)	2276 (55)	--	2217 (65)	2159 (159)	5
indeno[1,2,3- <i>cd</i> ]- pyrene	2080 ± 100 <sup>f</sup>	2090 (100)	2020 (120)	2134 (47)	2077 (49)	--	2107 (72)	1747 (123)	18
dibenz[ <i>a,j</i> ]- anthracene	267 ± 9 <sup>f</sup>	257 (12)	248 (11)	272 (16)	270 (9)	--	250 (9)	280 (24)	11
dibenz[ <i>a,c</i> ]- anthracene	183 ± 25 <sup>f</sup>	199 (10)	143 (8)	213 (9)	160 (11)	--	149 (10)	214 (11)	33
dibenz[ <i>a,h</i> ]- anthracene	301 ± 50 <sup>f</sup>	263 (12)	260 (14)	300 (18)	259 (8)	--	263 (11)	427 (22)	39
benzo[ <i>b</i> ]- chrysene	182 ± 6 <sup>f</sup>	172 (9)	173 (8)	190 (8)	183 (10)	--		173 (10)	9
picene	413 ± 15 <sup>f</sup>	399 (19)	399 (17)	425 (17)	--	--	384 (16)	423 (30)	10
coronene	603 ± 38 <sup>f</sup>	557 (26)	591 (41)	647 (35)	647 (16)	--	574 (16)	519 (42)	20

		<u>Method I<sup>b</sup></u>		<u>Method II</u>		<u>Method III</u>		<u>Method IV</u>	%
		<u>Method Ia</u>	<u>Method Ib</u>	<u>Method II a</u>	<u>Method II b</u>	<u>Method IIIa</u>	<u>Method IIIb</u>		
<i>GC column<sup>b</sup>:</i>	<b>COA Value<sup>c</sup></b>	DB-17 MS	liquid crystalline	DB-17 MS	liquid crystalline	DB-XLB	DB-17 MS	DB-17 MS	<b>Diff.<sup>d</sup></b>
dibenzo[ <i>b,k</i> ]- fluoranthene	596 ± 22 <sup>f</sup>	594 (36)	573 (35)	576 (12)	589 (22)	--	574 (16)	658 (40)	13
dibenzo[ <i>a,e</i> ]- pyrene	477 ± 67 <sup>f</sup>	420 (20)	459 (37)	481 (21)	441 (25)	--	428 (14)	669 (34)	37
<b>Reference Values</b>									
1-methyl- naphthalene	150 ± 37 <sup>i</sup>	--	--	111 (11)	--	173 (14)	--	157 (14)	36
2-methyl- naphthalene	227 ± 20 <sup>i</sup>	--	--	216 (54)	--	215 (28)	--	234 (20)	8
biphenyl	88 ± 21 <sup>i</sup>	109 (22)	--	--	--	75 (3)	--	75 (6)	32
retene	588 ± 34 <sup>j</sup>	--	--	576 (41)	--	--	--	--	na
1,7-dimethyl- phenanthrene	219 ± 19 <sup>i</sup>	--	--	199 (10)	--	--	--	231 (3)	14
1-methyl- fluoranthene	94 ± 11 <sup>i</sup>	--	--	92 (2)	101 (17)	--	--	182 (9)	49
3-methyl- fluoranthene	235 ± 67 <sup>i</sup>	--	--	214 (10)	295 (14)	--	--	162 (5)	45
8-methyl- fluoranthene	132 ± 7 <sup>j</sup>			132 (8)					na
4-methyl- pyrene	235 ± 27 <sup>i</sup>	--	--	227 (91)	240 (10)	--	--	223 (6)	7
2-methyl- pyrene	345 ± 10 <sup>j</sup>			345 (13)	--	--	--		
1-methyl- pyrene	209 ± 69 <sup>i</sup>	--	--	173 (65)	276 (28)	--	--	165 (4)	40
3-methyl- chrysene	146 ± 18 <sup>i</sup>	--	--	158 (7)	142 (5)	--	--	129 (7)	19

		<u>Method I<sup>b</sup></u>		<u>Method II</u>		<u>Method III</u>		<u>Method IV</u>	%
		<u>Method Ia</u>	<u>Method Ib</u>	<u>Method II a</u>	<u>Method II b</u>	<u>Method IIIa</u>	<u>Method IIIb</u>		
<i>GC column<sup>b</sup>:</i>	<b>COA Value<sup>c</sup></b>	DB-17 MS	liquid crystalline	DB-17 MS	liquid crystalline	DB-XLB	DB-17 MS	DB-17 MS	<b>Diff.<sup>d</sup></b>
2-methyl- chrysene	181 ± 4 <sup>j</sup>	--	--	181 (5)	--	--	--		na
6-methyl- chrysene	88 ± 14 <sup>i</sup>	--	--	98 (8)	--	--	--	75 (1)	23
4-methyl- and 1- methylchrysene	94.8 ± 4.8 <sup>j</sup>	--	--	95 (5)	--	--	--		na
9-methyl- and 3- methylbenz[ <i>a</i> ]- anthracene	92.3 ± 2.5 <sup>j</sup>	--	--	92 (3)	--	--	--		na
6-methyl- and 1- methylbenz[ <i>a</i> ]- anthracene	155 ± 5 <sup>j</sup>	--	--	155 (6)	--	--	--		na
anthanthrene	91 ± 27 <sup>i</sup>	88 (5)	66 (8)	--	--	--	--	112 (7)	41
dibenzo[ <i>b,e</i> ]- fluoranthene	59.6 ± 7.5 <sup>i</sup>	51 (2)	--	--	--	--	59.7 (0.2)	65 (2)	22
naphtho[1,2- <i>b</i> ]fluoranthene	312 ± 10 <sup>i</sup>	298 (8)	--	--	--	--	313 (7)		5
naphtho[1,2- <i>k</i> ]- fluoranthene and naphtho[2,3- <i>j</i> ]- fluoranthene	382 ± 18 <sup>i</sup>	377 (12)	--	--	--	--	387 (20)	359 (18)	7
naphtho[2,3- <i>b</i> ]- fluoranthene	93 ± 30 <sup>i</sup>	111 (45)	--	--	--	--	99 (10)	65 (3)	41
naphtho[2,3- <i>k</i> ]- fluoranthene	24.7 ± 1.2 <sup>j</sup>	--	24 (2)	--	--	--			na
dibenzo[ <i>a,k</i> ]- fluoranthene	14.3 ± 3.4 <sup>i</sup>	--	--	--	--	--	11 (1)	17 (1)	33



		<u>Method I<sup>b</sup></u>		<u>Method II</u>		<u>Method III</u>		<u>Method IV</u>	%
		<u>Method Ia</u>	<u>Method Ib</u>	<u>Method II a</u>	<u>Method II b</u>	<u>Method IIIa</u>	<u>Method IIIb</u>		
<b>GC column<sup>b</sup>:</b>	<b>COA Value<sup>c</sup></b>	DB-17 MS	liquid crystalline	DB-17 MS	liquid crystalline	DB-XLB	DB-17 MS	DB-17 MS	<b>Diff.<sup>d</sup></b>
dibenzo[ <i>j,l</i> ]- fluoranthene	260 ± 26 <sup>k</sup>	259 (13)	213 (11)	--	--	--	267 (11)	281 (12)	24
dibenzo[ <i>a,l</i> ]- pyrene	42.3 ± 3.1 <sup>i</sup>	39 (5)	--	--	--	--	42 (3)	44 (2)	11
naphtho[2,3- <i>k</i> ]fluoranthene and naphtho[1,2- <i>a</i> ]-pyrene	44.3 ± 1.9 <sup>i</sup>	42 (1)	--	--	--	--	44 (1)	45 (2)	7
naphtho[2,3- <i>e</i> ]- pyrene	145 ± 29 <sup>i</sup>	120 (3)	--	--	--	--	136 (10)	169 (8)	29
naphtho[2,1- <i>a</i> ]- pyrene	379 ± 47 <sup>k</sup>	310 (10)	354 (19)	--	--	--	388 (19)	434 (17)	29
dibenzo[ <i>e,l</i> ]- pyrene	208 ± 14 <sup>k</sup>	185 (6)	213 (19)	--	--	--	200 (1)	219 (8)	16
benzo[ <i>b</i> ]perylene	103 ± 24 <sup>i</sup>	121 (3)	81 (14)	--	--	--	--	--	33
dibenzo[ <i>a,i</i> ]pyrene	105 ± 11 <sup>i</sup>	112 (4)	94 (5)	--	--	--	--	--	16
dibenzo[ <i>a,h</i> ]pyrene	20.9 ± 0.7 <sup>j</sup>	--	--	--	--	--	--	24 (2)	na
average percentage difference:									20

<sup>a</sup> material as received contains approximately 2.1% moisture

<sup>b</sup> see SI Figure 1 for description of methods

<sup>c</sup> mass fractions (dry mass basis) reported on SRM 2585 Certificate of Analysis value; calculated from results from each of the methods as defined by corresponding footnote for each value

<sup>d</sup> percent difference between the maximum and minimum value; calculated as [max - min]/[max] \* 100

<sup>e</sup> Certified values are unweighted means of the results from three analytical methods. The uncertainty listed with the value is an expanded uncertainty about the mean, with coverage factor 2, calculated by combining a between-method variance (19) with a pooled, within-method variance following the ISO (20) and NIST Guides (21).

- <sup>f</sup> Certified values are weighted means of the results from four to six analytical methods (22). The uncertainty listed with each value is an expanded uncertainty about the mean, with coverage factor 2 (approximately 95 % confidence), except for phenanthrene and benzo[*a*]pyrene for which a coverage factor of 4 was used, calculated by combining a between-method variance incorporating inter-method bias with a pooled within-source variance following the ISO (20) and NIST Guides (21).
- <sup>g</sup> the numbers in parentheses are one standard deviation of a single measurement (1s)
- <sup>h</sup> not determined or reported
- <sup>i</sup> Reference values are unweighted means of the results from two or three analytical methods. The uncertainty listed with the value is an expanded uncertainty about the mean, with coverage factor 2, calculated by combining a between-method variance (19) with a pooled, within-method variance following the ISO (20) and NIST Guides (21).
- <sup>j</sup> Reference values are the means of results obtained by NIST using one analytical technique. The expanded uncertainty,  $U$ , is calculated as  $U = ku_c$ , where  $u_c$  is one standard deviation of the analyte mean, and the coverage factor,  $k$ , is determined from the Student's  $t$ -distribution corresponding to the associated degrees of freedom and 95 % confidence level for each analyte.
- <sup>k</sup> Reference values are weighted means of the results from four analytical methods (22). The uncertainty listed with each value is an expanded uncertainty about the mean, with coverage factor 2 (approximately 95 % confidence), calculated by combining a between-method variance incorporating inter-method bias with a pooled within-source variance following the ISO (20) and NIST Guides (21).

SI Table 3. Summary of analytical results (mass fractions in  $\mu\text{g kg}^{-1}$  as received)<sup>a</sup> for the determination of PCBs and chlorinated pesticides in SRM 2585 Organic Contaminants in House Dust

			Method I						% Diff. <sup>e</sup>
<u>PCB No.<sup>c</sup></u>	<u>Substitution Pattern</u>	<u>COA Value<sup>d</sup></u>	<u>Method Ia<sup>b</sup></u>	<u>Method Ib</u>	<u>Method II</u>	<u>Method III</u>			
			DB-XLB GC-ECD	DB-XLB GC-MS	DB-17 MS GC-MS	DB-5 GC-MS			
PCB 18	(2,2',5)	12.8 $\pm$ 1.0 <sup>f</sup>	13.1 (1.5) <sup>l</sup>	10.7 (2.5)	11.9 (0.5)	13.6 (0.5)			21
PCB 28	(2,4,4')	13.4 $\pm$ 0.5 <sup>g</sup>	-- <sup>m</sup> --	13.0 (1.1)	13.3 (0.5)	-- --			2
PCB 31	(2,4',5)	14.0 $\pm$ 0.5 <sup>g</sup>	-- --	13.4 (0.8)	14.0 (0.6)	-- --			4
PCB 44	(2,2'3,5')	18.1 $\pm$ 1.9 <sup>f</sup>	19.0 (1.7)	15.2 (1.0)	16.8 (0.7)	20.1 (0.7)			24
PCB 49	(2,2'4,5')	(16.4 $\pm$ 3.3) <sup>h</sup>	15.0 (1.8)	13.6 (1.8)	14.0 (0.6)	21.5 (0.7)			37
PCB 52	(2,2',5,5')	21.8 $\pm$ 1.9 <sup>f</sup>	19.7 (1.9)	20.9 (1.4)	20.2 (0.7)	24.5 (1.2)			20
PCB 56	(2,3,3',4)	4.42 $\pm$ 0.28 <sup>g</sup>	4.5 (0.6)	4.2 (0.5)	4.4 (0.2)	<4			6
PCB 63	(2,3,4',5)	(6.69 $\pm$ 0.26) <sup>i</sup>	6.6 (0.3)	-- --	<5	<4			na
PCB 66	(2,3',4,4')	(8.5 $\pm$ 1.9) <sup>j</sup>	-- --	6.9 (1.1)	8.0 (0.6)	10.0 (0.8)			31
PCB 70	(2,3',4',5)	13.1 $\pm$ 1.2 <sup>f</sup>	14.4 (0.8)	11.5 (0.9)	12.1 (0.7)	13.5 (1.3)			20
PCB 74	(2,4,4',5)	5.22 $\pm$ 0.51 <sup>f</sup>	5.1 (1.0)	4.4 (0.9)	4.9 (0.3)	5.8 (0.6)			24
PCB 87	(2,2',3,4,5')	16.6 $\pm$ 0.8 <sup>f</sup>	16.5 (1.0)	15.2 (1.0)	15.9 (0.6)	17.5 (0.7)			13
PCB 92	(2,2',3,5,5)	5.48 $\pm$ 0.72 <sup>g</sup>	-- --	5.5 (0.7)	5.9 (0.3)	4.7 (0.4)			20
PCB 95	(2,2',3,5',6)	22.7 $\pm$ 2.6 <sup>g</sup>	-- --	20.5 (1.6)	21.6 (0.8)	24.7 (1.8)			17
PCB 99	(2,2',4,4',5)	11.6 $\pm$ 0.4 <sup>f</sup>	11.4 (1.0)	10.6 (1.4)	11.1 (0.6)	11.9 (0.6)			11
PCB 101	(2,2',4,5,5')	29.8 $\pm$ 2.3 <sup>g</sup>	-- --	27.9 (1.8)	27.9 (0.7)	31.7 (0.7)			12
PCB 105	(2,3,3',4,4')	13.2 $\pm$ 1.4 <sup>g</sup>	-- --	12.1 (0.9)	12.1 (0.5)	14.4 (0.5)			16

# Method I

<i><b>PCB No<sup>c</sup></b></i>	<i><b>Substitution Pattern</b></i>	<i><b>COA Value<sup>d</sup></b></i>	<b>Method I</b>				<b>% Diff.<sup>e</sup></b>
			<u><b>Method Ia<sup>b</sup></b></u> DB-XLB GC-ECD	<u><b>Method Ib</b></u> DB-XLB GC-MS	<u><b>Method II</b></u> DB-17 MS GC-MS	<u><b>Method III</b></u> DB-5 GC-MS	
PCB 107	(2,3,3',4,5')	4.14 ± 0.47 <sup>g</sup>	3.9 (0.9)	4.2 (1.2)	4.1 (0.3)	<4	8
PCB 110	(2,3,3',4',6)	28.1 ± 3.7 <sup>f</sup>	22.3 (1.2)	28.7 (1.2)	26.4 (0.8)	32.4 (0.7)	31
PCB 118	(2,3',4,4',5)	26.3 ± 1.7 <sup>f</sup>	25.5 (2.2)	24.7 (2.1)	24.3 (0.8)	28.4 (1.1)	14
PCB 121	(2,3',4,5',6)	(18.7 ± 0.4) <sup>i</sup>	-- --	-- --	-- --	18.3 (0.5)	na
PCB 128	(2,2',3,3',4,4')	(8.1 ± 1.6) <sup>j</sup>	-- --	-- --	6.6 (0.4)	9.2 (0.7)	28
PCB 138	(2,2',3,4,4',5')	27.6 ± 2.1 <sup>f</sup>	29.8 (1.3)	24.7 (1.7)	25.3 (0.8)	28.1 (1.5)	17
PCB 146	(2,2',3,4',5,5')	4.89 ± 0.38 <sup>f</sup>	4.4 (0.4)	5.3 (0.5)	4.5 (0.3)	5.1 (0.5)	18
PCB 149	(2,2',3,4',5',6)	24.4 ± 1.9 <sup>f</sup>	24.2 (1.4)	21.6 (1.8)	23.0 (0.9)	26.7 (0.9)	19
PCB 151	(2,2',3,5,5',6)	6.92 ± 0.64 <sup>g</sup>	-- --	6.5 (0.4)	6.4 (0.2)	7.4 (0.5)	14
PCB 153 + PCB 132	(2,2',4,4',5,5') + (2,2',3,3',4,6') <sup>k</sup>	40.2 ± 1.8 <sup>f</sup>	37.5 (2.6)	40.8 (3.1)	37.8 (1.1)	41.4 (1.1)	9
PCB 158	(2,3,3',4,4',6)	4.50 ± 0.43 <sup>f</sup>	4.6 (0.4)	4.0 (0.5)	4.9 (0.2)	4.0 (0.3)	20
PCB 163	(2,3,3',4',5,6)	7.2 ± 1.2 <sup>f</sup>	6.3 (0.3)	6.6 (0.7)	6.4 (0.3)	9.2 (0.8)	31
PCB 170	(2,2',3,3',4,4',5)	8.8 ± 1.0 <sup>f</sup>	8.2 (1.4)	7.8 (1.0)	8.0 (0.4)	10.2 (0.7)	24
PCB 174	(2,2',3,3',4,5,6')	8.83 ± 0.47 <sup>f</sup>	8.7 (0.9)	9.1 (1.2)	9.0 (0.3)	8.1 (0.3)	11
PCB 177	(2,2',3,3',4,5,6)	(5.50 ± 0.44) <sup>i</sup>	-- --	-- --	-- --	5.4 (0.6)	na
PCB 178	(2,2',3,3',5,5',6)	(2.17 ± 0.16) <sup>i</sup>	-- --	-- --	-- --	2.1 (0.2)	na
PCB 180	(2,2',3,4,4',5,5')	18.4 ± 3.2 <sup>g</sup>	20.9 (1.2)	17.7 (2.1)	-- --	15.6 (1.0)	26
PCB 183	(2,2',3,4,4',5',6)	5.27 ± 0.39 <sup>f</sup>	4.9 (0.2)	5.0 (0.6)	5.0 (0.2)	5.8 (0.4)	17

# Method I

<u>PCB No<sup>c</sup></u>	<u>Substitution Pattern</u>	<u>COA Value<sup>d</sup></u>	<u>Method Ia<sup>b</sup></u>		<u>Method Ib</u>		<u>Method II</u>		<u>Method III</u>		% Diff. <sup>e</sup>
			DB-XLB GC-ECD		DB-XLB GC-MS		DB-17 MS GC-MS		DB-5 GC-MS		
PCB 185	(2,2',3,4,5,5',6)	(5.32 ± 0.39) <sup>i</sup>	--	--	--	--	--	--	5.2 (0.5)		na
PCB 187	(2,2',3,4',5,5',6)	11.3 ± 1.4 <sup>f</sup>	10.6	(0.3)	10	(0.8)	10.1	(0.4)	13.5 (0.6)		26
PCB 193	(2,3,3',4',5,5',6)	(1.23 ± 0.070) <sup>i</sup>	1.2	(0.1)	--	--	--	--	<4		na
PCB 194	(2,2',3,3',4,4',5,5')	(4.47 ± 0.76) <sup>j</sup>	3.8	(0.3)	--	--	<5		5.0 (0.3)		25
PCB 199	(2,2',3,3',4,5,6,6')	(5.81 ± 0.38) <sup>i</sup>	--	--	--	--			5.7 (0.5)		na
PCB 206	(2,2',3,3',4,4',5,5',6)	3.81 ± 0.13 <sup>g</sup>	3.8	(0.2)	--	--	<5		3.7 (0.2)		3
PCB 209	decachlorobiphenyl	(2.14 ± 0.11) <sup>i</sup>	2.1	(0.1)	--	--	<5		<4		na
<u>Chlorinated Pesticides</u>											
	4,4'-DDE	261 ± 2 <sup>f</sup>	241	(73)	251	(64)	255	(13)	256 (4)		6
	4,4'-DDD	27.3 ± 0.8 <sup>g</sup>	26.2	(0.6)	--	--	27	(2)	-- --		4
	2,4'-DDT	44.5 ± 3.9 <sup>g</sup>	41.3	(6.6)	--	--	46	(2)	-- --		10
	4,4'-DDT	111 ± 23 <sup>g</sup>	94	(10)	--	--	99	(4)	132 (5)		29
	cis-chlordane	(174 ± 45) <sup>j</sup>	144	(20)	--	--	149	(13)	219 (5)		34
	trans-chlordane	(277 ± 96) <sup>j</sup>	215	(30)	--	--	220	(12)	377 (6)		43
	cis-nonachlor	(28.0 ± 0.6) <sup>i</sup>	--	--	--	--	--	--	27.4 (0.8)		na
	trans-nonachlor	(130 ± 38) <sup>j</sup>	104	(13)	--	--	109	(6)	169 (2)		38

### Method I

<u>PCB No<sup>c</sup></u>	<u>Substitution Pattern</u>	<u>COA Value<sup>d</sup></u>	<u>Method I</u>				<u>% Diff.<sup>e</sup></u>
			<u>Method Ia<sup>b</sup></u> DB-XLB GC-ECD	<u>Method Ib</u> DB-XLB GC-MS	<u>Method II</u> DB-17 MS GC-MS	<u>Method III</u> DB-5 GC-MS	
	heptachlor	(166 ± 34) <sup>j</sup>	187 (42)	-- --	-- --	138 (6)	26
	heptachlor epoxide	(11.3 ± 0.6) <sup>i</sup>	-- --	-- --	-- --	11.1 (0.7)	na
	dieldrin	(88 ± 21) <sup>j</sup>	68 (13)	-- --	-- --	104 (11)	35
	<i>gamma</i> -HCH	(4.06 ± 0.55) <sup>i</sup>	4.0 (0.7)	-- --	<5	<4	na
	mirex	(6.89 ± 0.25) <sup>i</sup>	6.7 (0.3)	-- --	<8	<4	na
	pentachlorobenzene	(20.9 ± 1.6) <sup>i</sup>	-- --	-- --	-- --	20 (2)	na
average percentage difference:							20

<sup>a</sup> material as received contains approximately 2.1% moisture

<sup>b</sup> see SI Figure 2 for description of methods

<sup>c</sup> PCB congeners are numbered according to the scheme proposed by Ballschmiter and Zell (23) and later revised by Schulte and Malisch (24) to conform with IUPAC rules; for the specific congeners mentioned in this SRM, only PCB 107 is different in the numbering systems. Under the Ballschmiter and Zell numbering system, the IUPAC PCB 107 is listed as PCB 108.

<sup>d</sup> concentrations reported on dry-mass basis

<sup>e</sup> percent difference between the maximum and minimum value; calculated as  $[\max - \min]/[\max] * 100$

<sup>f</sup> Certified values are weighted means of the results from four analytical methods (22). The uncertainty listed with each value is an expanded uncertainty about the mean, with coverage factor 2 (approximately 95 % confidence), calculated by combining a between-method variance incorporating inter-method bias with a pooled within-source variance following the ISO (20) and NIST Guides (21).

<sup>g</sup> Certified values are unweighted means of the results from two or three analytical methods. The uncertainty listed with the value is an expanded uncertainty about the mean, with coverage factor 2, calculated by combining a between-method variance (19) with a pooled, within-method variance following the ISO (20) and NIST Guides (21).

<sup>h</sup> Reference values are weighted means of the results from four analytical methods (22). The uncertainty listed with each value is an expanded uncertainty about the mean, with coverage factor 2 (approximately 95 % confidence), calculated by combining a between-method variance

incorporating inter-method bias with a pooled within-source variance following the ISO (20) and NIST Guides (21).

- <sup>i</sup> Reference values are the means of results obtained by NIST using one analytical technique. The expanded uncertainty,  $U$ , is calculated as  $U = ku_c$ , where  $u_c$  is one standard deviation of the analyte mean, and the coverage factor,  $k$ , is determined from the Student's  $t$ -distribution corresponding to the associated degrees of freedom and 95 % confidence level for each analyte.
- <sup>j</sup> Reference values are unweighted means of the results from two to three analytical methods. The uncertainty listed with the value is an expanded uncertainty about the mean, with coverage factor 2, calculated by combining a between-method variance (19) with a pooled, within-method variance following the ISO (20) and NIST Guides (21).
- <sup>k</sup> PCB 153 is the primary component with PCB 132 contributing at most 10 % to the concentration based on the data from method II.
- <sup>l</sup> the numbers in parentheses are one standard deviation of a single measurement (1s)
- <sup>m</sup> not determined or reported

SI Table 4. Certified Concentrations (mass fractions in  $\mu\text{g kg}^{-1}$  dry mass)<sup>a</sup> for PAHs in SRM 2585 Organic Contaminants in House Dust Compared to Literature Values

			<i>Literature Values of PAHs in House Dust</i>								
			SRM	<u>Various<sup>e</sup></u>	<u>Berlin<sup>e</sup></u>	<u>MA<sup>f</sup></u>	<u>NC<sup>g</sup></u>		<u>NC<sup>h</sup></u>	<u>NC<sup>i</sup></u>	<u>Ohio<sup>j</sup></u>
			2583 <sup>c</sup>	2004	2004	2003	2003	2003	2001	1999	1995
<i>PAHs</i>	<u>Value<sup>b</sup></u>	<u>Uncertainty<sup>b</sup></u>	<i>dust</i> <i>composite<sup>d</sup></i>	<i>various</i>	<i>apartments</i>	<i>homes</i>	<i>homes</i>	<i>care</i> 10 27 <i>day</i>	<i>care</i> <i>day</i>	<i>homes</i> 330	<i>homes</i>
naphthalene	266	± 8		1175	200 (1900)		(35)	(46)	8 (26)	(4300)	530
dibenzothiophene	109	± 8									
phenanthrene	1920	± 20		2343	960 (2110)		144 (596)	338 (703)	263 (875)	440 (2150)	46800
anthracene	96.0	± 5.2		284	70 (210)	<RL (3050)	17 (66)	45 (92)	24 (76)	120 (750)	4230
4H-cyclopenta[ <i>def</i> ]- phenathrene	117	± 10									
3-methylphenanthrene	293	± 36									
2-methylphenanthrene	352	± 40									
9-methylphenanthrene	205	± 16									
1-methylphenanthrene	197	± 29									
fluoranthene	4380	± 100		4058	960 (3190)		297 (1560)	437 (908)	502 (1830)	520 (1890)	90000
pyrene	3290	± 30		3111	670 (2280)	1330 (39800)	229 (1200)	354 (721)	402 (1460)	430 (1650)	70200
benzo[ <i>ghi</i> ]fluoranthene	317	± 11									
benzo[ <i>c</i> ]phenanthrene	288	± 10									
benz[ <i>a</i> ]anthracene	1160	± 54	880	1476	290 (1410)	499 (10000)	90 (519)	166 (345)	195 (562)	220 (690)	34800
chrysene	2260	± 60	1720	1987	550 (2000)		169 (838)	213 (424)	374 (1210)	390 (2410)	45900
triphenylene	589	± 17									



			Literature Values of PAHs in House Dust									
PAHs	Value <sup>b</sup>		Uncertainty <sup>b</sup>	SRM	Various <sup>e</sup>	Berlin <sup>e</sup>	MA <sup>f</sup>	NC <sup>g</sup>		NC <sup>h</sup>	NC <sup>i</sup>	Ohio <sup>j</sup>
				2583 <sup>c</sup> <i>dust</i> <i>composite</i> <sup>d</sup>	2004 <i>various</i>	2004 <i>apartments</i>	2003 <i>homes</i>	2003 <i>homes</i>	2003 <i>day</i> <i>care</i> 253 298	2001 <i>day</i> <i>care</i> 416	1999 <i>homes</i>	1995 <i>homes</i>
benzo[ <i>b</i> ]fluoranthene	2700	± 90		1390	108000 <sup>e</sup>	540 (1900)		(1440)	(609)	(1290)		
benzo[ <i>j</i> ]fluoranthene	1320	± 110										
benzo[ <i>k</i> ]fluoranthene	1330	± 70		1460	w/ b[ <i>b</i> ]f	370 (1910)		50 (496)	113 (236)	137 (433)		
benzo[ <i>a</i> ]fluoranthene	74.5	± 8.1										
benzo[ <i>e</i> ]pyrene	2160	± 80			1733	400 (1420)		144 (809)	159 (319)	225 (662)	260 (750)	41900
benzo[ <i>a</i> ]pyrene	1140	± 10		970	2110	270 (1390)	712 (18100)	134 (768)	191 (403)	292 (820)	230 (630)	46200
perylene	387	± 23										
benzo[ <i>ghi</i> ]perylene	2280	± 40		1090	1380	350 (1280)		173 (961)	188 (368)	198 (725)	250 (610)	6890
indeno[1,2,3- <i>cd</i> ]pyrene	2080	± 100		990	1593	330 (1170)		169 (963)	197 (396)	206 (786)	230 (700)	34300
dibenz[ <i>a,j</i> ]anthracene	267	± 9										
dibenz[ <i>a,c</i> ]anthracene	183	± 25										
dibenz[ <i>a,h</i> ]anthracene	301	± 50		220	410	50 (290)		60 (294)	73 (144)	54 (207)	100 (410)	31800
benzo[ <i>b</i> ]chrysene	182	± 6										
picene	413	± 15										
coronene	603	± 38		1220	359	160 (470)		67 (320)	59 (104)	53 (206)	130 (500)	6410
dibenzo[ <i>b,k</i> ]fluoranthene <sup>k</sup>	596	± 22										
dibenzo[ <i>a,e</i> ]pyrene <sup>k</sup>	477	± 67		250								

<sup>a</sup> material as received contains approximately 2.1% moisture

<sup>b</sup> certified values and uncertainties described in SI Table 2; see also SRM 2585 Certificate of Analysis (1) available at [www.nist.gov/srm](http://www.nist.gov/srm)

<sup>c</sup> SRM 2583, Trace Elements in Indoor Dust, Nominal 90 mg kg<sup>-1</sup> Lead, PAH values reported by Lewis et al. (25); SRM 2585 partially consists of dust used to prepare SRM 2583 (70%)

<sup>d</sup> composite of dust from homes, cleaning services, motels, and hotels

<sup>e</sup> reported by Fromme et al. (26), median values of 61 samples collected during a survey of 123 residences, maximum value in parentheses

<sup>f</sup> reported by Rudel et al. (27), median values of samples collected during a survey of 120 homes, maximum value in parentheses (RL = reporting limit)

<sup>g</sup> reported by Wilson et al. (28), mean values of samples collected from selected homes of children (n=9; left column) and two child day care centers (n=4) in the Raleigh, Durham, and Chapel Hill area of North Carolina, USA; maximum value in parentheses

<sup>h</sup> reported by Wilson et al. (29), mean values of samples collected from selected child day care centers in the Raleigh, Durham, and Chapel Hill area of North Carolina, USA; maximum value in parentheses

<sup>i</sup> reported by Chuang et al. (30), mean values from a survey of 24 low-income homes in Durham and the North Carolina Piedmont area, USA, maximum value in parentheses

<sup>j</sup> reported by Chuang et al. (31), mean values of triplicate samples collected during an eight-home survey in Columbus, Ohio, USA

<sup>k</sup> six-ring PAHs (molecular mass 302), additional compounds reported in Table 2 in the paper; in SI Figure 3 dibenzo[*b,k*]fluoranthene is peak number 8 and dibenzo[*a,e*]pyrene is peak number 18

SI Table 5. Certified and Reference Concentrations (mass fractions in  $\mu\text{g kg}^{-1}$  dry mass)<sup>a</sup> for PCBs and Chlorinated Pesticides in SRM 2585 Organic Contaminants in House Dust Compared to Literature Values

	<u>SRM 2585</u>			<u>Literature Values for PCBs and Pesticides in House Dust</u>						
	<u>Value</u> <sup>b</sup>	±	<u>Uncertainty</u> <sup>b</sup>	SRM	MA <sup>d</sup>	NC <sup>e</sup>	NC <sup>f</sup>		CO <sup>g</sup>	
				2583 <sup>c</sup>	<u>2003</u> <i>homes</i>	<u>2003</u> <i>homes</i>	<u>2003</u> <i>day care</i>	<u>2001</u> <i>day care</i>	<u>1975</u> <i>homes</i> <sup>h</sup>	<u>1975</u> <i>farms</i> <sup>i</sup>
PCB 18	12.8	±	1.0							
PCB 28	13.4	±	0.5			5 (18)	37 (79)	136 (1194)		
PCB 31	14.0	±	0.5							
PCB 44	18.1	±	1.9			6 (13)	19 (45)	126 (456)		
PCB 49	(16.4	±	3.3)							
PCB 52	21.8	±	1.9		15700	9 (26)	32 (61)	18 (737)		
PCB 56	4.42	±	0.28							
PCB 63	(6.69	±	0.26)							
PCB 66	(8.5	±	1.9)							
PCB 70	13.1	±	1.2			8 (17)	23 (59)	87 (353)		
PCB 74	5.22	±	0.51							
PCB 87	16.6	±	0.8			11 (24)	14 (30)	452 (2587)		
PCB 92	5.48	±	0.72							
PCB 95	22.7	±	2.6			4 (16)	10 (26)	497 (2842)		
PCB 99	11.6	±	0.4							
PCB 101	29.8	±	2.3			14 (36)	19 (45)	852 (4903)		
PCB 105	13.2	±	1.4		16500	6 (18)	11 (27)	157 (868)		
PCB 107	4.14	±	0.47							
PCB 110	28.1	±	3.7			18 (44)	28 (69)	102 (586)		
PCB 118	26.3	±	1.7			14 (35)	20 (47)	524 (3000)		
PCB 121	(18.7	±	0.4)							
PCB 128	(8.1	±	1.6)							
PCB 138	27.6	±	2.1			12 (22)	19 (44)	454 (2600)		

	SRM 2585			Literature Values for PCBs and Pesticides in House Dust							
	Value <sup>b</sup>	±	Uncertainty <sup>b</sup>	SRM 2583 <sup>c</sup>	MA <sup>d</sup>	NC <sup>e</sup>		NC <sup>f</sup>	CO <sup>g</sup>		
					<u>2003</u> <i>homes</i>	<u>2003</u> <i>homes</i>	<u>2003</u> <i>day care</i>	<u>2001</u> <i>day care</i>	<u>1975</u> <i>homes<sup>h</sup></i>	<u>1975</u> <i>farms<sup>i</sup></i>	<u>1975</u> <i>other<sup>j</sup></i>
PCB 146	4.89	±	0.38								
PCB 149	24.4	±	1.9								
PCB 151	6.92	±	0.64								
PCB 153 + 132	40.2	±	1.8		35300 <sup>k</sup>	13 (25) <sup>k</sup>	17 (34) <sup>k</sup>	194 (1060) <sup>k</sup>			
PCB 158	4.50	±	0.43								
PCB 163	7.2	±	1.2								
PCB 170	8.8	±	1.0								
PCB 174	8.83	±	0.47								
PCB 177	(5.50	±	0.44)								
PCB 178	(2.17	±	0.16)								
PCB 180	18.4	±	3.2			10 (22)	11 (19)	434 (2500)			
PCB 183	5.27	±	0.39								
PCB 185	(5.32	±	0.39)								
PCB 187	11.3	±	1.4								
PCB 193	(1.23	±	0.070)								
PCB 194	(4.47	±	0.76)								
PCB 199	(5.81	±	0.38)								
PCB 206	3.81	±	0.13								
PCB 209	(2.14	±	0.11)								
4,4'-DDE	261	±	2	< 110	738	7 (47)	5 (13)	101 (254)	4370	3280	4830
4,4'-DDD	27.3	±	0.8						1770	6111	2950
2,4'-DDT	44.5	±	3.9						2670	2910	6310
4,4'-DDT	111	±	23	< 100	9610	121 (782)	11 (41)	73 (211)	6900	8870	30660
<i>cis</i> -chlordane	(174	±	45)	70	9970	55 (256)	132 (263)	148 (565)			
<i>trans</i> -chlordane	(277	±	96)	120	10600	98 (471)	149 (293)	234 (689)			

<u>SRM 2585</u>				<u>Literature Values for PCBs and Pesticides in House Dust</u>							
					MA <sup>d</sup>	NC <sup>e</sup>		NC <sup>f</sup>	CO <sup>g</sup>		
				SRM	<u>2003</u>	<u>2003</u>	<u>2003</u>	<u>2001</u>	<u>1975</u>	<u>1975</u>	<u>1975</u>
<u>Value<sup>b</sup></u> ± <u>Uncertainty<sup>b</sup></u>				2583 <sup>c</sup>	<i>homes</i>	<i>homes</i>	<i>day care</i>	<i>day care</i>	<i>homes<sup>h</sup></i>	<i>farms<sup>i</sup></i>	<i>other<sup>j</sup></i>
<i>cis</i> -nonachlor	(28.0	±	0.6)								
<i>trans</i> -nonachlor	(130	±	38)								
heptachlor	(166	±	34)	300		119 (335)	24 (48)	253 (1234)			
heptachlor epoxide	(11.3	±	0.6)								
dieldrin	(88	±	21)		4890	18 (50)	9 (24)	500 (1470)	2940	4420	8920
<i>gamma</i> -HCH	(4.06	±	0.55)			33 (46)	149 (293)	13 (34)		2050	5850
mirex	(6.89	±	0.25)								
pentachlorobenzene	(20.9	±	1.6)								

<sup>a</sup> material as received contains approximately 2.1% moisture

<sup>b</sup> values and uncertainties are described in SI Table 3; also see Certificate of Analysis (I) available at [www.nist.gov/srm](http://www.nist.gov/srm); values in parentheses are listed as reference values

<sup>c</sup> SRM 2583, Trace Elements in Indoor Dust, Nominal 90 mg kg<sup>-1</sup> Lead, composite of dust from homes, cleaning services, motels, and hotels, pesticide values reported by Lewis et al. (25); SRM 2585 partially consists of dust used to prepare SRM 2583 (70%)

<sup>d</sup> reported by Rudel et al. (27), maximum values of samples collected during a survey of 120 homes, median values reported as “less than reporting limit” for all compounds except 4,4'-DDT (median value = 279 µg kg<sup>-1</sup>)

<sup>e</sup> reported by Wilson et al. (28), mean values of samples collected from selected homes of children (n=9; left column) and two child day care centers (n=4) in the Raleigh, Durham, and Chapel Hill area of North Carolina, USA; maximum value in parentheses

<sup>f</sup> reported by Wilson et al. (29), mean values of samples collected from selected child day care centers in the Raleigh, Durham, and Chapel Hill area of North Carolina, USA; maximum value in parentheses

<sup>g</sup> reported by Starr et al. (32), mean values of samples above detection limit

<sup>h</sup> homes with no known occupational exposure to pesticides and minimal home-use exposure (32)

<sup>i</sup> homes with highest agricultural use of pesticides among participants (32)

<sup>j</sup> homes with residents employed in local pesticide formulating plants or professional applicators who mixed and loaded pesticides for commercial use (32)

<sup>k</sup> PCB 153 not reported in combination with 132

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