Supplementary information

Short-, medium-, and long-chain chlorinated paraffins in South African indoor dust and cat hair

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Materials. Seven commercially available CP standard mixtures C_{10}-C_{13} (SCCP 51.5%Cl), C_{10}-C_{13} (SCCP 55.5%Cl), C_{14}-C_{17} (MCCP 42%Cl), C_{14}-C_{17} (MCCP 52%Cl), C_{14}-C_{17} (MCCP 57%Cl), C_{18}-C_{20} (LCCP 36%Cl), C_{18}-C_{20} (LCCP 49%Cl), and $^{13}C_{10}$-anti-Dechlorane Plus® ($^{13}C_{10}$-anti-DP) were purchased from Dr. Ehrenstorfer GmbH (Augsburg, Germany). Dust standard reference material (SRM 2585) was purchased from The National Institute of Standards and Technology (NIST) (Gaithersburg, MD, USA). The solvents and chemicals used were all analytical or HLPC grade, unless otherwise stated. Dichloromethane (DCM), methanol, acetone, and n-hexane were purchased from J.T Baker, Deventer, The Netherlands. Whatman® grade 541 filter paper, silica gel, and Florisil® were purchased from Sigma-Aldrich (now Merck), Amsterdam, The Netherlands.

Table S1. Details on samples associated with vacuum cleaner bags (VD), freshly collected dust (FD) and cat hair (CH)

	VD	**FD**	**C-hair**
House 1	VD-1	FD-1	CH-1A, CH-1B
House 2	VD-2	FD-2	CH-2A, CH-2B, CH-2C, CH-2D
House 3	VD-3	FD-3	CH-3
House 4	VD-4	FD-4	CH-4A, CH-4B
House 5	VD-5	FD-5	CH-5
House 6	VD-6	FD-6	CH-6
House 7	VD-7	FD-7	
House 8	VD-8	FD-8	
House 9	VD-9	FD-9	
House 10	VD-10	FD-10	
House 11	VD-11		

Quadrupole time-of-flight mass spectrometry (qTOF-MS) settings: The atmospheric pressure chemical ionization (APCI) source parameters included: vaporizer and drying gas temperatures of 300°C and 200°C respectively, and nitrogen gas flow rates of 2.0 L/min for the nebulizer and drying gas. The capillary voltage was set at 2.0 eV and the corona current at 6000 nA. The qTOF-MS was operated in negative ion mode and full scan data was collected from *m/z* 200 to 1500 at a resolution of 25,000 FWHM (full width at half maximum). Internal mass calibration was performed by introducing the Agilent APCI-L low concentration tuning mix (part No: G1969-85010). The standard deviation for the mass calibration was better than 0.3 ppm. The total analysis run time was 4 minutes.

Table S2. Theoretical *m/z* ratios and isotopic abundances ratios of quantitation and qualifier $[M+Cl]^-$ ions for CPs.

Formula $[M+Cl]^-$	Quan ion	Qual ion	Ratio (%)	Formula $[M+Cl]^-$	Quan ion	Qual ion	Ratio (%)	Formula $[M+Cl]^-$	Quan ion	Qual ion	Ratio (%)
C9H17Cl3	267.0061	265.0090	77.9	C24H43Cl7	615.0822	613.0850	87.8	C32H47Cl19	1140.7312	1138.7340	96.3
C9H16Cl4	300.9671	302.9642	64.3	C24H42Cl8	649.0432	647.0460	77.0	C32H46Cl20	1174.6922	1172.6950	90.7
C9H15Cl5	334.9281	336.9252	80.2	C24H41Cl9	683.0042	685.0014	86.7	C32H45Cl21	1208.6532	1210.6504	91.9
C9H14Cl6	368.8891	370.8862	96.2	C24H40Cl10	716.9652	718.9624	97.3	C32H44Cl22	1242.6142	1244.6113	97.2
C9H13Cl7	404.8472	402.8502	89.1	C24H39Cl11	752.9234	750.9262	92.6	C32H43Cl23	1278.5723	1276.5752	97.5
C9H12Cl8	438.8083	436.8112	78.0	C24H38Cl12	786.8844	784.8873	84.3	C32H42Cl24	1312.5333	1310.5362	92.7
C9H11Cl9	472.7693	474.7664	85.5	C24H37Cl13	820.8454	822.8426	89.0	C32H41Cl25	1346.4943	1348.4915	92.5
C10H19Cl3	281.0217	279.0246	77.8	C24H36Cl14	854.8064	856.8036	97.0	C32H40Cl26	1380.4554	1382.4525	97.0
C10H18Cl4	314.9828	316.9799	64.3	C24H35Cl15	890.7646	888.7674	95.3	C32H39Cl27	1416.4135	1414.4164	98.4
C10H17Cl5	348.9438	350.9409	80.3	C24H34Cl16	924.7256	922.7284	88.5	C32H38Cl28	1450.3745	1448.3774	94.2
C10H16Cl6	382.9048	384.9019	96.3	C24H33Cl17	958.6866	960.6837	90.4	C32H37Cl29	1484.3355	1486.3327	92.9
C10H15Cl7	418.8629	416.8658	89.1	C24H32Cl18	992.6476	994.6447	96.8	C33H65Cl3	603.3821	601.3846	74.4
C10H14Cl8	452.8239	450.8268	78.0	C24H31Cl19	1028.6057	1026.6086	96.9	C33H64Cl4	637.3430	639.3406	67.7

C10H13Cl9	486.7849	488.7820	85.5	C24H30Cl20	1062.5668	1060.5696	91.3	C33H63Cl5	671.3040	673.3015	83.7
C10H12Cl10	520.7460	522.7430	96.2	C24H29Cl21	1096.5278	1098.5249	91.3	C33H62Cl6	705.2650	707.2624	99.6
C11H21Cl3	295.0374	293.0403	77.7	C24H28Cl22	1130.4888	1132.4859	96.7	C33H61Cl7	741.2233	739.2260	86.6
C11H20Cl4	328.9984	330.9955	64.4	C24H27Cl23	1166.4469	1164.4498	98.0	C33H60Cl8	775.1843	777.1817	77.2
C11H19Cl5	362.9594	364.9565	80.4	C24H26Cl24	1200.4079	1198.4108	93.2	C33H59Cl9	809.1453	811.1426	87.9
C11H18Cl6	396.9205	398.9175	96.4	C25H49Cl3	491.2567	489.2594	76.0	C33H58Cl10	843.1063	845.1036	98.5
C11H17Cl7	432.8786	430.8815	89.0	C25H48Cl4	525.2177	527.2151	66.1	C33H57Cl11	879.0645	877.0673	91.6
C11H16Cl8	466.8396	464.8425	77.9	C25H47Cl5	559.1787	561.1760	82.1	C33H56Cl12	913.0255	911.0283	83.5
C11H15Cl9	500.8006	502.7977	85.6	C25H46Cl6	593.1397	595.1369	98.0	C33H55Cl13	946.9865	948.9837	89.9
C11H14Cl10	534.7616	536.7587	96.3	C25H45Cl7	629.0979	627.1007	87.7	C33H54Cl14	980.9475	982.9447	97.9
C11H13Cl11	570.7197	568.7226	93.5	C25H44Cl8	663.0589	661.0617	76.9	C33H53Cl15	1016.9057	1014.9085	94.5
C12H23Cl3	309.0531	307.0559	77.6	C25H43Cl9	697.0199	699.0171	86.8	C33H52Cl16	1050.8667	1048.8695	87.8
C12H22Cl4	343.0141	345.0112	64.5	C25H42Cl10	730.9809	732.9781	97.4	C33H51Cl17	1084.8277	1086.8249	91.1
C12H21Cl5	376.9751	378.9722	80.5	C25H41Cl11	766.9391	764.9419	92.5	C33H50Cl18	1118.7887	1120.7859	97.5
C12H20Cl6	410.9361	412.9332	96.4	C25H40Cl12	800.9001	798.9029	84.2	C33H49Cl19	1154.7469	1152.7497	96.2
C12H19Cl7	446.8942	444.8971	88.9	C25H39Cl13	834.8611	836.8583	89.1	C33H48Cl20	1188.7079	1186.7107	90.7
C12H18Cl8	480.8552	478.8582	77.9	C25H38Cl14	868.8221	870.8193	97.1	C33H47Cl21	1222.6689	1224.6660	92.0
C12H17Cl9	514.8163	516.8133	85.6	C25H37Cl15	904.7803	902.7831	95.2	C33H46Cl22	1256.6299	1258.6270	97.3
C12H16Cl10	548.7773	550.7744	96.3	C25H36Cl16	938.7413	936.7441	88.5	C33H45Cl23	1292.5880	1290.5909	97.5
C12H15Cl11	584.7354	582.7383	93.5	C25H35Cl17	972.7023	974.6994	90.5	C33H44Cl24	1326.5490	1324.5519	92.7
C12H14Cl12	618.6964	616.6993	85.0	C25H34Cl18	1006.6633	1008.6604	96.9	C33H43Cl25	1360.5100	1362.5072	92.5
C13H25Cl3	323.0687	321.0716	77.6	C25H33Cl19	1042.6214	1040.6243	96.8	C33H42Cl26	1394.4710	1396.4682	97.1
C13H24Cl4	357.0297	359.0269	64.6	C25H32Cl20	1076.5824	1074.5853	91.2	C33H41Cl27	1430.4292	1428.4320	98.4
C13H23Cl5	390.9907	392.9879	80.5	C25H31Cl21	1110.5434	1112.5406	91.4	C33H40Cl28	1464.3902	1462.3930	94.1
C13H22Cl6	424.9518	426.9489	96.5	C25H30Cl22	1144.5044	1146.5016	96.7	C34H67Cl3	617.3978	615.4002	74.2
C13H21Cl7	460.9099	458.9128	88.9	C25H29Cl23	1180.4626	1178.4655	98.0	C34H66Cl4	651.3587	653.3563	68.0
C13H20Cl8	494.8709	492.8738	77.8	C25H28Cl24	1214.4236	1212.4265	93.1	C34H65Cl5	685.3197	687.3172	83.9
C13H19Cl9	528.8319	530.8290	85.7	C25H27Cl25	1248.3846	1250.3817	92.1	C34H64Cl6	719.2807	721.2781	99.8
C13H18Cl10	562.7929	564.7900	96.4	C26H51Cl3	505.2724	503.2750	75.8	C34H63Cl7	755.2390	753.2417	86.4
C13H17Cl11	598.7510	596.7540	93.4	C26H50Cl4	539.2334	541.2307	66.3	C34H62Cl8	789.2000	791.1974	77.4
C13H16Cl12	632.7121	630.7150	85.0	C26H49Cl5	573.1943	575.1917	82.3	C34H61Cl9	823.1610	825.1583	88.0
C13H15Cl13	666.6731	668.6702	88.3	C26H48Cl6	607.1553	609.1526	98.2	C34H60Cl10	857.1219	859.1192	98.6
C14H27Cl3	337.0844	335.0872	77.5	C26H47Cl7	643.1136	641.1164	87.6	C34H59Cl11	893.0802	891.0829	91.5
C14H26Cl4	371.0454	373.0425	64.7	C26H46Cl8	677.0746	675.0774	76.8	C34H58Cl12	927.0412	925.0439	83.4
C14H25Cl5	405.0064	407.0035	80.6	C26H45Cl9	711.0356	713.0328	86.9	C34H57Cl13	961.0022	962.9994	90.0
C14H24Cl6	438.9674	440.9645	96.6	C26H44Cl10	744.9966	746.9938	97.5	C34H56Cl14	994.9632	996.9604	98.0
C14H23Cl7	474.9255	472.9284	88.8	C26H43Cl11	780.9548	778.9576	92.4	C34H55Cl15	1030.9214	1028.9242	94.4
C14H22Cl8	508.8866	506.8895	77.8	C26H42Cl12	814.9158	812.9186	84.2	C34H54Cl16	1064.8824	1062.8852	87.7
C14H21Cl9	542.8476	544.8447	85.8	C26H41Cl13	848.8768	850.8739	89.2	C34H53Cl17	1098.8434	1100.8406	91.2
C14H20Cl10	576.8086	578.8057	96.4	C26H40Cl14	882.8378	884.8349	97.2	C34H52Cl18	1132.8044	1134.8016	97.6
C14H19Cl11	612.7667	610.7696	93.4	C26H39Cl15	918.7959	916.7988	95.1	C34H51Cl19	1168.7625	1166.7654	96.2
C14H18Cl12	646.7277	644.7306	84.9	C26H38Cl16	952.7569	950.7598	88.4	C34H50Cl20	1202.7235	1200.7264	90.6
C14H17Cl13	680.6887	682.6858	88.3	C26H37Cl17	986.7179	988.7151	90.6	C34H49Cl21	1236.6845	1238.6817	92.0
C14H16Cl14	714.6498	716.6469	96.3	C26H36Cl18	1020.6789	1022.6761	96.9	C34H48Cl22	1270.6455	1272.6427	97.4
C15H29Cl3	351.1000	349.1029	77.4	C26H35Cl19	1056.6371	1054.6400	96.8	C34H47Cl23	1306.6037	1304.6065	97.4
C15H28Cl4	385.0610	387.0582	64.8	C26H34Cl20	1090.5981	1088.6010	91.1	C34H46Cl24	1340.5647	1338.5675	92.6
C15H27Cl5	419.0221	421.0192	80.7	C26H33Cl21	1124.5591	1126.5562	91.5	C34H45Cl25	1374.5257	1376.5229	92.6
C15H26Cl6	452.9831	454.9802	96.7	C26H32Cl22	1158.5201	1160.5172	96.8	C34H44Cl26	1408.4867	1410.4839	97.2
C15H25Cl7	488.9412	486.9441	88.7	C26H31Cl23	1194.4783	1192.4811	97.9	C34H43Cl27	1444.4449	1442.4477	98.3
C15H24Cl8	522.9022	520.9051	77.7	C26H30Cl24	1228.4393	1226.4421	93.1	C34H42Cl28	1478.4059	1476.4087	94.1
C15H23Cl9	556.8632	558.8603	85.8	C26H29Cl25	1262.4003	1264.3974	92.1	C35H69Cl3	631.4135	629.4159	73.9
C15H22Cl10	590.8243	592.8214	96.5	C26H28Cl26	1296.3613	1298.3584	96.7	C35H68Cl4	665.3744	667.3720	68.2
C15H21Cl11	626.7824	624.7853	93.3	C27H53Cl3	519.2881	517.2907	75.6	C35H67Cl5	699.3353	701.3329	84.1
C15H20Cl12	660.7434	658.7463	84.9	C27H52Cl4	553.2490	555.2464	66.5	C35H66Cl6	735.2938	733.2963	100.0
C15H19Cl13	694.7044	696.7015	88.4	C27H51Cl5	587.2100	589.2073	82.4	C35H65Cl7	769.2547	767.2573	86.2
C15H18Cl14	728.6654	730.6625	96.4	C27H50Cl6	621.1710	623.1683	98.4	C35H64Cl8	803.2157	805.2131	77.6
C15H17Cl15	764.6235	762.6265	95.8	C27H49Cl7	657.1293	655.1320	87.4	C35H63Cl9	837.1766	839.1740	88.2
C16H31Cl3	365.1157	363.1185	77.3	C27H48Cl8	691.0902	689.0930	76.7	C35H62Cl10	871.1376	873.1349	98.8
C16H30Cl4	399.0767	401.0739	64.9	C27H47Cl9	725.0512	727.0485	87.0	C35H61Cl11	907.0959	905.0986	91.4
C16H29Cl5	433.0377	435.0349	80.8	C27H46Cl10	759.0122	761.0095	97.7	C35H60Cl12	941.0569	939.0596	83.3
C16H28Cl6	466.9987	468.9959	96.8	C27H45Cl11	794.9704	792.9732	92.3	C35H59Cl13	975.0178	977.0151	90.2
C16H27Cl7	502.9569	500.9598	88.7	C27H44Cl12	828.9314	826.9343	84.1	C35H58Cl14	1008.9788	1010.9761	98.1
C16H26Cl8	536.9179	534.9208	77.6	C27H43Cl13	862.8924	864.8896	89.3	C35H57Cl15	1044.9371	1042.9398	94.3
C16H25Cl9	570.8789	572.8760	85.9	C27H42Cl14	896.8534	898.8506	97.3	C35H56Cl16	1078.8980	1076.9008	87.7
C16H24Cl10	604.8399	606.8370	96.6	C27H41Cl15	932.8116	930.8144	95.0	C35H55Cl17	1112.8590	1114.8563	91.3
C16H23Cl11	640.7980	638.8009	93.3	C27H40Cl16	966.7726	964.7755	88.3	C35H54Cl18	1146.8200	1148.8172	97.7
C16H22Cl12	674.7591	672.7620	84.8	C27H39Cl17	1000.7336	1002.7308	90.6	C35H53Cl19	1182.7782	1180.7810	96.1
C16H21Cl13	708.7201	710.7172	88.4	C27H38Cl18	1034.6946	1036.6918	97.0	C35H52Cl20	1216.7392	1214.7420	90.5
C16H20Cl14	742.6811	744.6782	96.4	C27H37Cl19	1070.6528	1068.6556	96.7	C35H51Cl21	1250.7002	1252.6974	92.1
C16H19Cl15	778.6392	776.6421	95.8	C27H36Cl20	1104.6138	1102.6166	91.1	C35H50Cl22	1284.6612	1286.6584	97.4
C16H18Cl16	812.6002	810.6031	89.0	C27H35Cl21	1138.5748	1140.5719	91.5	C35H49Cl23	1320.6194	1318.6222	97.3
C17H33Cl3	379.1314	377.1342	77.1	C27H34Cl22	1172.5358	1174.5329	96.9	C35H48Cl24	1354.5804	1352.5832	92.5
C17H32Cl4	413.0924	415.0896	65.0	C27H33Cl23	1208.4939	1206.4968	97.9	C35H47Cl25	1388.5414	1390.5386	92.7
C17H31Cl5	447.0534	449.0505	80.9	C27H32Cl24	1242.4549	1240.4578	93.0	C35H46Cl26	1422.5024	1424.4996	97.2
C17H30Cl6	481.0144	483.0115	96.9	C27H31Cl25	1276.4160	1278.4131	92.2	C35H45Cl27	1458.4606	1456.4634	98.2
C17H29Cl7	516.9725	514.9754	88.6	C27H30Cl26	1310.3770	1312.3741	96.7	C35H44Cl28	1492.4216	1490.4244	94.0
C17H28Cl8	550.9336	548.9364	77.6	C27H29Cl27	1346.3351	1344.3380	98.7	C36H71Cl3	645.4291	643.4315	73.7
C17H27Cl9	584.8946	586.8917	86.0	C28H55Cl3	533.3037	531.3063	75.4	C36H70Cl4	679.3901	681.3877	68.4
C17H26Cl10	618.8556	620.8527	96.6	C28H54Cl4	567.2647	569.2621	66.7	C36H69Cl5	713.3510	715.3486	84.3
C17H25Cl11	654.8137	652.8166	93.2	C28H53Cl5	601.2257	603.2230	82.6	C36H68Cl6	749.3095	747.3120	99.7

C17H24Cl12	688.7747	686.7776	84.8
C17H23Cl13	722.7357	724.7328	88.5
C17H22Cl14	756.6968	758.6939	96.5
C17H21Cl15	792.6549	790.6578	95.7
C17H20Cl16	826.6159	824.6188	88.9
C17H19Cl17	860.5769	862.5740	90.0
C18H35Cl3	393.1470	391.1498	77.0
C18H34Cl4	427.1080	429.1052	65.1
C18H33Cl5	461.0690	463.0662	81.1
C18H32Cl6	495.0301	497.0272	97.0
C18H31Cl7	530.9882	528.9911	88.5
C18H30Cl8	564.9492	562.9521	77.5
C18H29Cl9	598.9102	600.9074	86.1
C18H28Cl10	632.8712	634.8684	96.7
C18H27Cl11	668.8294	666.8323	93.1
C18H26Cl12	702.7904	700.7933	84.7
C18H25Cl13	736.7514	738.7485	88.6
C18H24Cl14	770.7124	772.7095	96.5
C18H23Cl15	806.6705	804.6734	95.7
C18H22Cl16	840.6316	838.6345	88.9
C18H21Cl17	874.5926	876.5897	90.0
C18H20Cl18	908.5536	910.5507	96.4
C19H37Cl3	407.1627	405.1655	76.9
C19H36Cl4	441.1237	443.1209	65.2
C19H35Cl5	475.0847	477.0819	81.2
C19H34Cl6	509.0457	511.0429	97.2
C19H33Cl7	545.0039	543.0067	88.4
C19H32Cl8	578.9649	576.9677	77.4
C19H31Cl9	612.9259	614.9230	86.2
C19H30Cl10	646.8869	648.8840	96.8
C19H29Cl11	682.8450	680.8479	93.1
C19H28Cl12	716.8061	714.8089	84.7
C19H27Cl13	750.7671	752.7642	88.6
C19H26Cl14	784.7281	786.7252	96.6
C19H25Cl15	820.6862	818.6891	95.6
C19H24Cl16	854.6472	852.6501	88.8
C19H23Cl17	888.6082	890.6053	90.1
C19H22Cl18	922.5693	924.5664	96.5
C19H21Cl19	958.5274	956.5303	97.2
C20H39Cl3	421.1784	419.1811	76.7
C20H38Cl4	455.1394	457.1366	65.4
C20H37Cl5	489.1004	491.0976	81.3
C20H36Cl6	523.0614	525.0586	97.3
C20H35Cl7	559.0195	557.0224	88.3
C20H34Cl8	592.9806	590.9834	77.4
C20H33Cl9	626.9416	628.9387	86.2
C20H32Cl10	660.9026	662.8997	96.9
C20H31Cl11	696.8607	694.8636	93.0
C20H30Cl12	730.8217	728.8246	84.6
C20H29Cl13	764.7827	766.7799	88.7
C20H28Cl14	798.7438	800.7409	96.7
C20H27Cl15	834.7019	832.7048	95.5
C20H26Cl16	868.6629	866.6658	88.8
C20H25Cl17	902.6239	904.6210	90.2
C20H24Cl18	936.5849	938.5820	96.5
C20H23Cl19	972.5430	970.5459	97.1
C20H22Cl20	1006.5041	1004.5070	91.5
C21H41Cl3	435.1940	433.1968	76.6
C21H40Cl4	469.1550	471.1523	65.5
C21H39Cl5	503.1160	505.1132	81.5
C21H38Cl6	537.0770	539.0742	97.4
C21H37Cl7	573.0352	571.0380	88.2
C21H36Cl8	606.9962	604.9991	77.3
C21H35Cl9	640.9572	642.9544	86.3
C21H34Cl10	674.9182	676.9154	97
C21H33Cl11	710.8764	708.8793	92.9
C21H32Cl12	744.8374	742.8403	84.5
C21H31Cl13	778.7984	780.7955	88.8
C21H30Cl14	812.7594	814.7565	96.8
C21H29Cl15	848.7176	846.7204	95.5
C21H28Cl16	882.6786	880.6815	88.7
C21H27Cl17	916.6396	918.6367	90.2
C21H26Cl18	950.6006	952.5977	96.6
C21H25Cl19	986.5587	984.5616	97.1
C21H24Cl20	1020.5197	1018.5226	91.4
C21H23Cl21	1054.4807	1056.4779	91.2
C22H43Cl3	449.2097	447.2124	76.5
C22H42Cl4	483.1707	485.1680	65.7
C22H41Cl5	517.1317	519.1289	81.6
C22H40Cl6	551.0927	553.0899	97.6
C28H52Cl6	635.1867	637.1840	98.6
C28H51Cl7	671.1449	669.1477	87.3
C28H50Cl8	705.1059	703.1087	76.6
C28H49Cl9	739.0669	741.0642	87.2
C28H48Cl10	773.0279	775.0251	97.8
C28H47Cl11	808.9861	806.9889	92.2
C28H46Cl12	842.9471	840.9499	84.0
C28H45Cl13	876.9081	878.9053	89.4
C28H44Cl14	910.8691	912.8663	97.4
C28H43Cl15	946.8273	944.8301	94.9
C28H42Cl16	980.7883	978.7911	88.2
C28H41Cl17	1014.7493	1016.7465	90.7
C28H40Cl18	1048.7103	1050.7075	97.1
C28H39Cl19	1084.6685	1082.6713	96.6
C28H38Cl20	1118.6295	1116.6323	91.0
C28H37Cl21	1152.5905	1154.5876	91.6
C28H36Cl22	1186.5515	1188.5486	96.9
C28H35Cl23	1222.5096	1220.5125	97.8
C28H34Cl24	1256.4706	1254.4735	93.0
C28H33Cl25	1290.4316	1292.4288	92.2
C28H32Cl26	1324.3926	1326.3898	96.8
C28H31Cl27	1360.3508	1358.3537	98.7
C28H30Cl28	1394.3118	1392.3147	94.4
C29H57Cl3	547.3194	545.3220	75.2
C29H56Cl4	581.2804	583.2778	66.9
C29H55Cl5	615.2413	617.2387	82.8
C29H54Cl6	649.2023	651.1997	98.8
C29H53Cl7	685.1606	683.1633	87.2
C29H52Cl8	719.1216	721.1189	76.7
C29H51Cl9	753.0826	755.0798	87.3
C29H50Cl10	787.0436	789.0408	97.9
C29H49Cl11	823.0018	821.0046	92.1
C29H48Cl12	856.9628	854.9656	83.9
C29H47Cl13	890.9238	892.9210	89.5
C29H46Cl14	924.8848	926.8820	97.5
C29H45Cl15	960.8430	958.8458	94.8
C29H44Cl16	994.8040	992.8068	88.2
C29H43Cl17	1028.7650	1030.7621	90.8
C29H42Cl18	1062.7260	1064.7231	97.2
C29H41Cl19	1098.6841	1096.6870	96.6
C29H40Cl20	1132.6451	1130.6480	90.9
C29H39Cl21	1166.6061	1168.6033	91.7
C29H38Cl22	1200.5671	1202.5643	97.0
C29H37Cl23	1236.5253	1234.5282	97.7
C29H36Cl24	1270.4863	1268.4892	92.9
C29H35Cl25	1304.4473	1306.4444	92.3
C29H34Cl26	1338.4083	1340.4055	96.8
C29H33Cl27	1374.3665	1372.3693	98.6
C29H32Cl28	1408.3275	1406.3303	94.4
C29H31Cl29	1442.2885	1444.2856	92.7
C30H59Cl3	561.3351	559.3376	75.0
C30H58Cl4	595.2960	597.2935	67.1
C30H57Cl5	629.2570	631.2544	83.0
C30H56Cl6	663.2180	665.2153	99.0
C30H55Cl7	699.1763	697.1790	87.0
C30H54Cl8	733.1373	735.1346	76.8
C30H53Cl9	767.0983	769.0955	87.4
C30H52Cl10	801.0592	803.0565	98.1
C30H51Cl11	837.0175	835.0202	92.0
C30H50Cl12	870.9785	868.9813	83.8
C30H49Cl13	904.9395	906.9367	89.6
C30H48Cl14	938.9005	940.8977	97.6
C30H47Cl15	974.8586	972.8615	94.7
C30H46Cl16	1008.8196	1006.8225	88.1
C30H45Cl17	1042.7806	1044.7778	90.9
C30H44Cl18	1076.7416	1078.7388	97.3
C30H43Cl19	1112.6998	1110.7026	96.5
C30H42Cl20	1146.6608	1144.6637	90.9
C30H41Cl21	1180.6218	1182.6190	91.7
C30H40Cl22	1214.5828	1216.5800	97.1
C30H39Cl23	1250.5410	1248.5438	97.7
C30H38Cl24	1284.5020	1282.5048	92.8
C30H37Cl25	1318.4630	1320.4601	92.3
C30H36Cl26	1352.4240	1354.4211	96.9
C30H35Cl27	1388.3821	1386.3850	98.6
C30H34Cl28	1422.3431	1420.3460	94.3
C30H33Cl29	1456.3042	1458.3013	92.8
C30H32Cl30	1490.2652	1492.2623	96.8
C31H61Cl3	575.3508	573.3533	74.8
C31H60Cl4	609.3117	611.3092	67.3
C36H67Cl7	783.2704	781.2730	86.1
C36H66Cl8	817.2313	819.2288	77.7
C36H65Cl9	851.1923	853.1897	88.3
C36H64Cl10	885.1533	887.1506	98.9
C36H63Cl11	921.1116	919.1143	91.3
C36H62Cl12	955.0725	953.0753	83.2
C36H61Cl13	989.0335	991.0308	90.3
C36H60Cl14	1022.9945	1024.9918	98.2
C36H59Cl15	1058.9527	1056.9555	94.1
C36H58Cl16	1092.9137	1090.9165	87.6
C36H57Cl17	1126.8747	1128.8720	91.4
C36H56Cl18	1160.8357	1162.8329	97.8
C36H55Cl19	1196.7939	1194.7967	96.0
C36H54Cl20	1230.7549	1228.7577	90.4
C36H53Cl21	1264.7159	1266.7131	92.2
C36H52Cl22	1298.6769	1300.6741	97.5
C36H51Cl23	1334.6351	1332.6379	97.2
C36H50Cl24	1368.5961	1366.5989	92.5
C36H49Cl25	1402.5571	1404.5543	92.7
C36H48Cl26	1436.5181	1438.5152	97.3
C36H47Cl27	1472.4762	1470.4791	98.2
C37H73Cl3	659.4448	657.4472	73.5
C37H72Cl4	693.4057	695.4034	68.7
C37H71Cl5	727.3667	729.3643	84.6
C37H70Cl6	763.3251	761.3277	99.5
C37H69Cl7	797.2861	795.2886	85.9
C37H68Cl8	831.2470	833.2444	77.9
C37H67Cl9	865.2080	867.2054	88.5
C37H66Cl10	899.1690	901.1663	99.1
C37H65Cl11	935.1273	933.1299	91.1
C37H64Cl12	969.0882	967.0909	83.1
C37H63Cl13	1003.0492	1005.0465	90.4
C37H62Cl14	1037.0102	1039.0075	98.4
C37H61Cl15	1072.9684	1070.9712	94.0
C37H60Cl16	1106.9294	1104.9322	87.5
C37H59Cl17	1140.8904	1142.8876	91.5
C37H58Cl18	1174.8514	1176.8486	97.9
C37H57Cl19	1210.8096	1208.8124	95.9
C37H56Cl20	1244.7706	1242.7734	90.4
C37H55Cl21	1278.7316	1280.7288	92.3
C37H54Cl22	1312.6926	1314.6898	97.6
C37H53Cl23	1348.6508	1346.6536	97.2
C37H52Cl24	1382.6118	1380.6146	92.4
C37H51Cl25	1416.5728	1418.5699	92.8
C37H50Cl26	1450.5338	1452.5309	97.4
C37H49Cl27	1486.4919	1484.4948	98.1
C38H75Cl3	673.4605	671.4628	73.2
C38H74Cl4	707.4214	709.4191	68.9
C38H73Cl5	741.3824	743.3800	84.8
C38H72Cl6	777.3408	775.3433	99.3
C38H71Cl7	811.3017	809.3043	85.7
C38H70Cl8	845.2627	847.2601	78.1
C38H69Cl9	879.2237	881.2211	88.7
C38H68Cl10	913.1846	915.1820	99.3
C38H67Cl11	949.1429	947.1456	91.0
C38H66Cl12	983.1039	981.1066	83.0
C38H65Cl13	1017.0649	1019.0622	90.5
C38H64Cl14	1051.0259	1053.0232	98.5
C38H63Cl15	1086.9841	1084.9869	93.9
C38H62Cl16	1120.9451	1118.9478	87.4
C38H61Cl17	1154.9061	1156.9033	91.6
C38H60Cl18	1188.8671	1190.8643	98.0
C38H59Cl19	1224.8253	1222.8281	95.8
C38H58Cl20	1258.7863	1256.7891	90.3
C38H57Cl21	1292.7473	1294.7445	92.4
C38H56Cl22	1326.7083	1328.7055	97.7
C38H55Cl23	1362.6665	1360.6693	97.1
C38H54Cl24	1396.6274	1394.6303	92.3
C38H53Cl25	1430.5884	1432.5856	92.9
C38H52Cl26	1464.5494	1466.5466	97.5
C39H77Cl3	687.4762	685.4785	73.0
C39H76Cl4	721.4371	723.4348	69.2
C39H75Cl5	755.3980	757.3956	85.1
C39H74Cl6	791.3565	789.3590	99.0
C39H73Cl7	825.3174	823.3200	85.5
C39H72Cl8	859.2784	861.2758	78.2
C39H71Cl9	893.2393	895.2368	88.8
C39H70Cl10	927.2003	929.1977	99.5
C39H69Cl11	963.1586	961.1613	90.8
C39H68Cl12	997.1196	995.1223	82.8

C22H39Cl7	587.0509	585.0537	88.1	C31H59Cl5	643.2727	645.2701	83.2	C39H67Cl13	1031.0806	1033.0779	90.7
C22H38Cl8	621.0119	619.0147	77.2	C31H58Cl6	677.2337	679.2310	99.2	C39H66Cl14	1065.0415	1067.0388	98.6
C22H37Cl9	654.9729	656.9701	86.4	C31H57Cl7	713.1920	711.1947	86.9	C39H65Cl15	1100.9998	1099.0025	93.8
C22H36Cl10	688.9339	690.9311	97.1	C31H56Cl8	747.1529	749.1503	76.9	C39H64Cl16	1134.9608	1132.9635	87.3
C22H35Cl11	724.8921	722.8949	92.8	C31H55Cl9	781.1139	783.1112	87.6	C39H63Cl17	1168.9218	1170.9190	91.7
C22H34Cl12	758.8531	756.8559	84.5	C31H54Cl10	815.0749	817.0722	98.2	C39H62Cl18	1202.8827	1204.8800	98.1
C22H33Cl13	792.8141	794.8112	88.8	C31H53Cl11	851.0332	849.0359	91.9	C39H61Cl19	1238.8410	1236.8437	95.7
C22H32Cl14	826.7751	828.7722	96.8	C31H52Cl12	884.9941	882.9969	83.7	C39H60Cl20	1272.8020	1270.8047	90.2
C22H31Cl15	862.7332	860.7361	95.4	C31H51Cl13	918.9551	920.9524	89.7	C39H59Cl21	1306.7629	1308.7602	92.5
C22H30Cl16	896.6942	894.6971	88.6	C31H50Cl14	952.9161	954.9133	97.7	C39H58Cl22	1340.7239	1342.7212	97.8
C22H29Cl17	930.6552	932.6524	90.3	C31H49Cl15	988.8743	986.8771	94.7	C39H57Cl23	1376.6821	1374.6849	97.0
C22H28Cl18	964.6163	966.6134	96.7	C31H48Cl16	1022.8353	1020.8381	88.0	C39H56Cl24	1410.6431	1408.6459	92.2
C22H27Cl19	1000.5744	998.5773	97	C31H47Cl17	1056.7963	1058.7935	91.0	C39H55Cl25	1444.6041	1446.6013	93.0
C22H26Cl20	1034.5354	1032.5383	91.4	C31H46Cl18	1090.7573	1092.7545	97.3	C39H54Cl26	1478.5651	1480.5623	97.5
C22H25Cl21	1068.4964	1070.4935	91.2	C31H45Cl19	1126.7155	1124.7183	96.4	C40H79Cl3	701.4919	699.4941	72.7
C22H24Cl22	1102.4574	1104.4545	96.6	C31H44Cl20	1160.6765	1158.6793	90.8	C40H78Cl4	735.4528	737.4506	69.5
C23H45Cl3	463.2254	461.2281	76.3	C31H43Cl21	1194.6375	1196.6347	91.8	C40H77Cl5	769.4137	771.4113	85.3
C23H44Cl4	497.1864	499.1837	65.8	C31H42Cl22	1228.5985	1230.5957	97.1	C40H76Cl6	805.3722	803.3747	98.8
C23H43Cl5	531.1474	533.1446	81.8	C31H41Cl23	1264.5567	1262.5595	97.6	C40H75Cl7	839.3331	837.3356	85.3
C23H42Cl6	565.1084	567.1056	97.7	C31H40Cl24	1298.5177	1296.5205	92.8	C40H74Cl8	873.2941	875.2916	78.4
C23H41Cl7	601.0666	599.0694	88	C31H39Cl25	1332.4787	1334.4758	92.4	C40H73Cl9	907.2550	909.2524	89.0
C23H40Cl8	635.0276	633.0304	77.1	C31H38Cl26	1366.4397	1368.4368	97.0	C40H72Cl10	941.2160	943.2134	99.6
C23H39Cl9	668.9886	670.9857	86.5	C31H37Cl27	1402.3978	1400.4007	98.5	C40H71Cl11	977.1743	975.1770	90.7
C23H38Cl10	702.9496	704.9467	97.2	C31H36Cl28	1436.3588	1434.3617	94.3	C40H70Cl12	1011.1353	1013.1326	82.8
C23H37Cl11	738.9077	736.9106	92.7	C31H35Cl29	1470.3198	1472.3170	92.9	C40H69Cl13	1045.0962	1047.0936	90.8
C23H36Cl12	772.8687	770.8716	84.4	C32H63Cl3	589.3664	587.3689	74.6	C40H68Cl14	1079.0572	1081.0545	98.8
C23H35Cl13	806.8297	808.8269	88.9	C32H62Cl4	623.3274	625.3249	67.5	C40H67Cl15	1115.0155	1113.0182	93.7
C23H34Cl14	840.7908	842.7879	96.9	C32H61Cl5	657.2883	659.2858	83.4	C40H66Cl16	1148.9765	1146.9792	87.2
C23H33Cl15	876.7489	874.7518	95.3	C32H60Cl6	691.2493	693.2467	99.4	C40H65Cl17	1182.9374	1184.9347	91.9
C23H32Cl16	910.7099	908.7128	88.6	C32H59Cl7	727.2077	725.2103	86.7	C40H64Cl18	1216.8984	1218.8957	98.2
C23H31Cl17	944.6709	946.6680	90.3	C32H58Cl8	761.1686	763.1660	77.1	C40H63Cl19	1252.8567	1250.8594	95.6
C23H30Cl18	978.6319	980.6291	96.7	C32H57Cl9	795.1296	797.1269	87.7	C40H62Cl20	1286.8177	1284.8204	90.1
C23H29Cl19	1014.5901	1012.5929	97	C32H56Cl10	829.0906	831.0879	98.3	C40H61Cl21	1320.7786	1322.7759	92.6
C23H28Cl20	1048.5511	1046.5540	91.3	C32H55Cl11	865.0488	863.0516	91.8	C40H60Cl22	1354.7396	1356.7369	97.9
C23H27Cl21	1082.5121	1084.5092	91.3	C32H54Cl12	899.0098	897.0126	83.6	C40H59Cl23	1390.6978	1388.7006	96.9
C23H26Cl22	1116.4731	1118.4702	96.6	C32H53Cl13	932.9708	934.9681	89.8	C40H58Cl24	1424.6588	1422.6616	92.2
C23H25Cl23	1152.4312	1150.4341	98.1	C32H52Cl14	966.9318	968.9290	97.8	C40H57Cl25	1458.6198	1460.6170	93.0
C24H47Cl3	477.2410	475.2437	76.1	C32H51Cl15	1002.8900	1000.8928	94.6	C40H56Cl26	1492.5808	1494.5780	97.6
C24H46Cl4	511.2020	513.1994	66	C32H50Cl16	1036.8510	1034.8538	87.9				
C24H45Cl5	545.1630	547.1603	81.9	C32H49Cl17	1070.8120	1072.8092	91.1				
C24H44Cl6	579.1240	581.1213	97.9	C32H48Cl18	1104.7730	1106.7702	97.4				

Table S3. Calculated degree of chlorination for the ΣSCCP, ΣMCCP and ΣLCCP technical mixtures

Technical mixture	Calculated Cl-degree
SCCP (51.5 %)	55.5%
SCCP (55.5 %)	57.8%
MCCP (42 %)	49.3%
MCCP (52 %)	54.1%
MCCP (57 %)	57.4%
LCCP (36 %)	38.2%
LCCP (49 %)	49.3%

Table S4. Total ΣSCCPs, ΣMCCPs and ΣLCCPs concentration in µg/g measured in the dust reference material (SRM 2585) with the degree of chlorination. The goodness of fit (R^2) below 0.5 are given in Italic and highlighted red with indicated that the reported values are tentative.

Sample	SCCP (µg/g)	R^2	Cl %	MCCP (µg/g)	R^2	Cl %	LCCP (µg/g)	R^2	Cl %
NIST 2585(1)	8.5	0.8	59%	11.9	0.7	52%	19.1	*<0.1*	40%
NIST 2585(2)	8.6	0.8	59%	11.6	0.7	52%	18.1	*<0.1*	40%
NIST 2585(3)	8.9	0.8	59%	12.4	0.7	52%	19.6	*<0.1*	40%
NIST 2585(4)	8.8	0.8	59%	11.9	0.7	52%	19.0	*<0.1*	40%
NIST 2585(5)	8.5	0.8	59%	11.7	0.7	52%	19.0	*<0.1*	40%
NIST 2585(6)	8.9	0.8	59%	12.0	0.7	52%	19.6	*<0.1*	40%
NIST 2585(7)	8.6	0.8	59%	12.2	0.7	52%	20.1	*<0.1*	40%
NIST 2585(8)	8.5	0.8	59%	12.1	0.7	52%	19.6	*<0.1*	40%
NIST 2585(9)	8.5	0.8	59%	12.1	0.7	52%	19.2	*<0.1*	39%

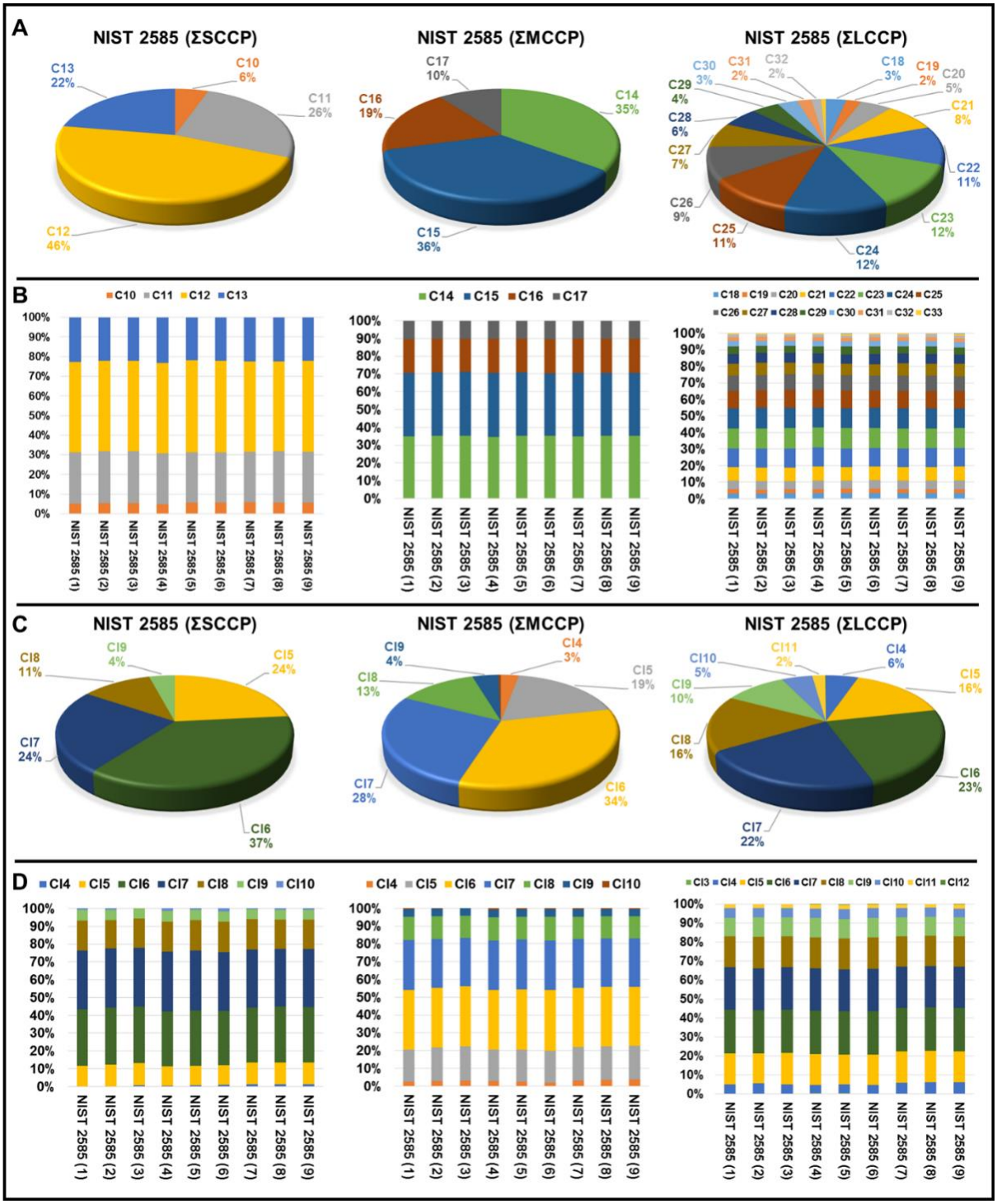

Fig. S1. Composition of CPs in the dust reference material (SRM 2585) (A), ΣSCCP, ΣMCCP, and ΣLCCP composition based on carbon chain length, (B) ΣSCCP, ΣMCCP, and ΣLCCP carbon chain length in the repeat measurements, (C) ΣSCCP, ΣMCCP, and ΣLCCP composition based on chlorine substitution, (D) ΣSCCP, ΣMCCP, and ΣLCCP chlorine substitution in the repeat measurements.

The use of non-traditional Kendrick MD plots for the identification of CP congeners. An average full scan mass spectrum of the chromatographic peaks was extracted using Bruker Compass DataAnalysis software and the accurate mass list was exported to Microsoft Excel. The non-traditional

Kendrick MD plots were constructed by converting the measured IUPAC *m/z* to [−H/+Cl] mass scales corresponding to the mass of a chlorine atom minus the mass of a hydrogen atom.

$$Accurate\ H/Cl\ scaled\ mass = Accurate\ mass\ (IUPAC\ mass) \times \left(\frac{34}{33.961028}\right)$$

$$H/Cl\ \ scaled\ mass\ detect = nominal\ mass\ (rounded) - \ accurate\ H/Cl\ scaled\ mass$$

As shown in Fig. S2, the Kendrick MD plots are graphically constructed as bubble plots by positioning the accurate masses on the x-axis and the corresponding H/Cl scaled mass defects on the y-axis with peak intensity as the bubble size. The CP congeners with the same carbon chain length (C_9 to C_{40}) and increased degree of substitution (Cl_3 <) are positioned on horizontal lines separated by H/Cl substitution. The congeners with the same degree of substitution and increased carbon chain length are positioned on diagonal lines. The coloured spheres in the Kendrick MD plots represent the quantifier and qualifier $[M+Cl]^-$ ions for SCCPs (red), MCCPs (green) and LCCPs (blue) which were positively identified based on the criteria discussed in the quantitation and deconvolution section. To briefly explain the outlay of the plot using C_{19}-congeners as an example, the $[M+Cl]^-$ IUPAC masses for $C_{19}H_{34}Cl_6$, $C_{19}H_{33}Cl_7$, and $C_{19}H_{32}Cl_8$ are 507.0486, 541.0096, and 574.9706 respectively. These masses are then converted to the H/Cl scaled masses, resulting in 507.6304, 541.6304, and 575.6304. By subtracting the new accurate H/Cl scaled masse from the rounded nominal mass, the H/Cl scaled mass defect for all three C_{19}-congeners is 0.6304. As shown in the enlarged region in Fig. S2B, these C_{19}-congeners are positioned on a horizontal line separated by H/Cl substitution. The CP congeners with carbon chains C_{31} to C_{40} appear at the bottom of the plot resulting in "wrap-around" due to the increase in mass defect as a result of the high proportion of hydrogen atoms. For example, when the IUPAC masses for $C_{30}H_{59}Cl_3$ (559.3376) and $C_{31}H_{61}Cl_3$ (573.3533) are converted to the respective H/Cl scaled masses, the new accurate H/Cl scaled masses are 559.9795 and 574.0112. The H/Cl scaled mass defect for $C_{30}H_{59}Cl_3$ is 0.9795, which are positioned at the top of the plot, and $C_{31}H_{61}Cl_3$ is 0.0112 which "wrap-around" to be positioned at the bottom of the plot.

As shown in Fig. S2B and S2C, the pattern observed for the VD-6 differs from the pattern observed for VD 2, where more abundant C_{19} and congeners >C_{29} were observed. The enlarged section shows the difference between measured and theoretical masses for the C_{19} homologue group ($C_{19}H_{35}Cl_5$ to $C_{19}H_{28}Cl_{12}$) depicted as black circles. The accurate masses for these congeners were within 10 ppm of the theoretical masses, but the ion ratios varied by more than 40% from the theoretical ion ratios (Fig. S3). This was also observed for the CP congeners with carbon lengths of C_{30} and longer. This emphasises the use of strict mass accuracy criteria and the use of ion pair intensity ratios to distinguish between positive identified CPs and the presence of possible interferences. This pattern was also observed for the cat hair (CH-6) taken from the same household.

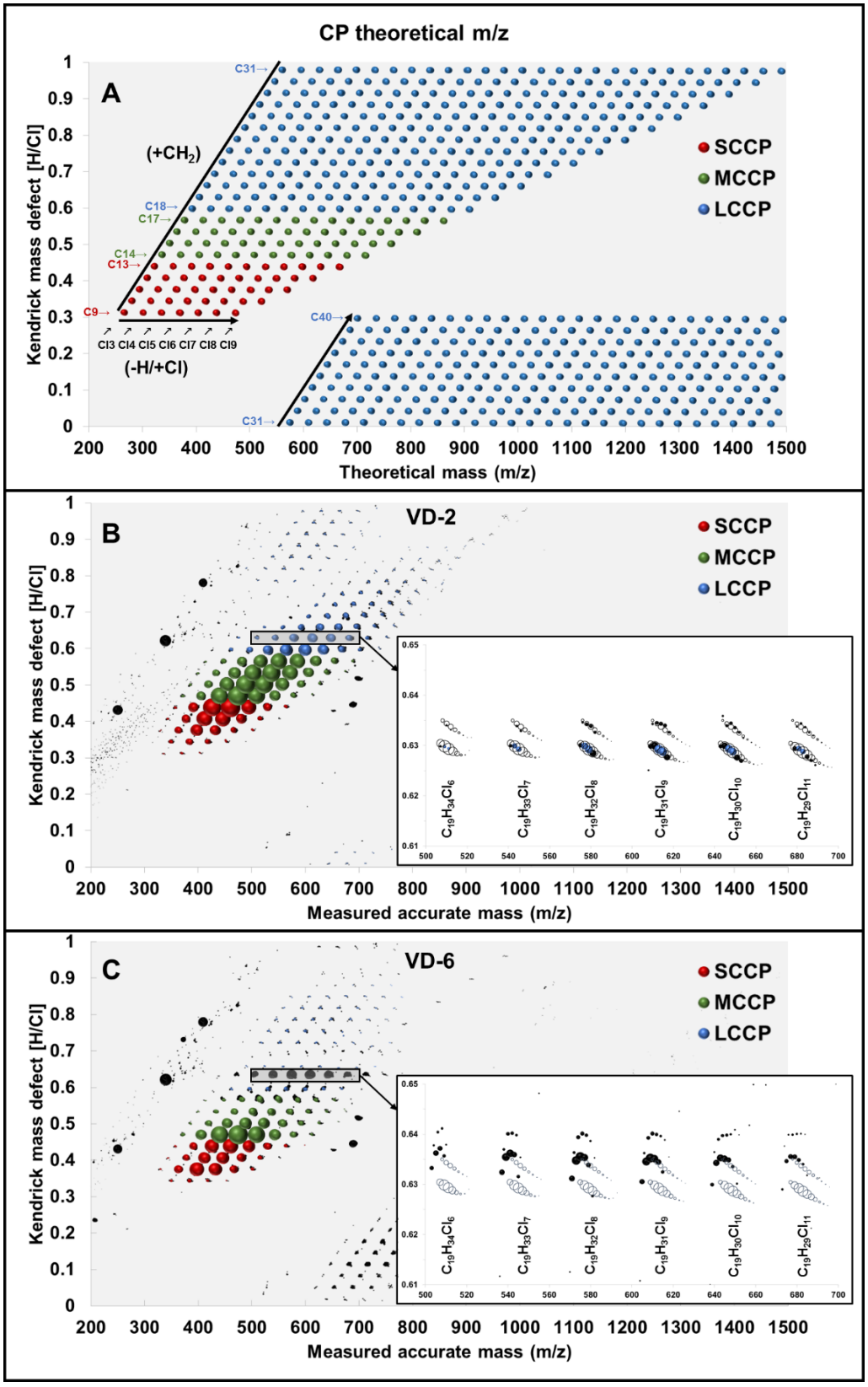

Fig. S2. Non-traditional Kendrick MD plots, (A) constructed from the theoretical m/z quantitation and qualifier [M+Cl]- ions for CPs listed in Table S1 (see text below for detailed explanation), (B) constructed for VD-2, (C) and VD-6. The red spheres represent the quantifier and qualifier $[M+Cl]^-$ ions for SCCPs, the green for MCCPs and the blue for LCCPs the sphere size represent the instrument response. The enlarged region shows the theoretical *m/z* and ion intensity ratios for $C_{19}H_{34}Cl_6$ to $C_{19}H_{29}Cl_{11}$ depicted as black circles.

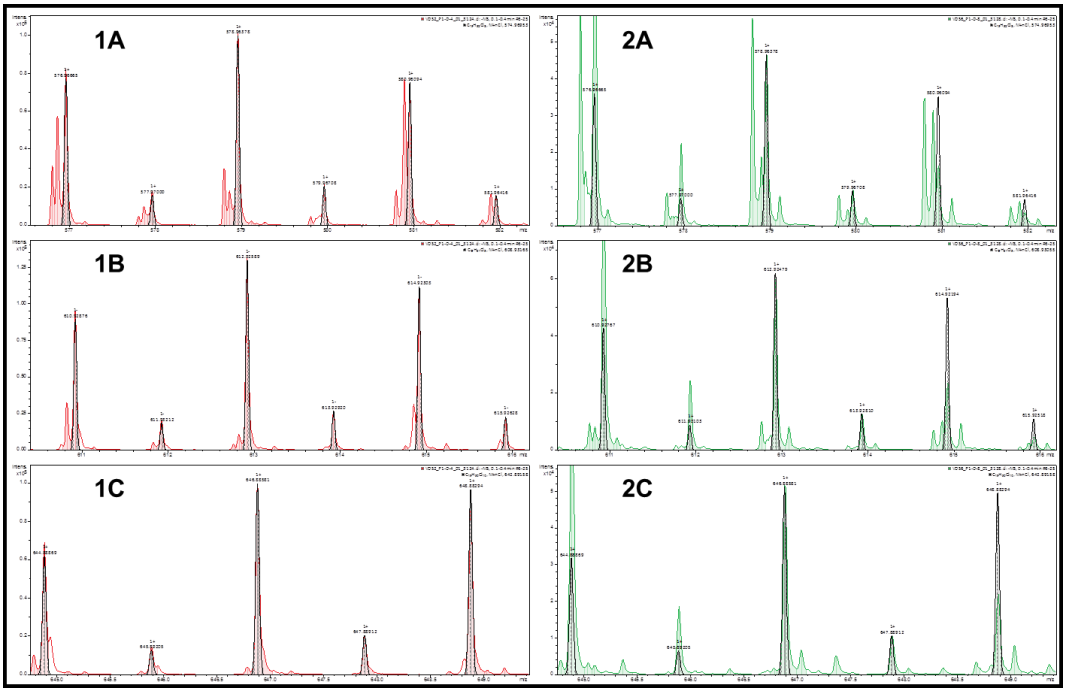

Fig. S3. Negative ion APCI-qTOF-MS mass scale-expanded segments of the mass spectra extracted for (A) $C_{19}H_{32}Cl_8$, (B) $C_{19}H_{31}Cl_9$, and (C) $C_{19}H_{30}Cl_{10}$ from (1) VD-2 in red and (2) VD-6 in green. The black profile represents the mass spectra for the theoretical $[M+Cl]^-$ ions of the respective congeners. This figure emphasises the ion ratio deviation observed for VD-6

Table S5. Total ΣSCCPs, ΣMCCPs, and ΣLCCPs concentration in µg/g for VD, FD and CH with the degree of chlorination. The goodness of fit (R^2) below 0.5 are given in Italic and highlighted red with indicated that the reported values are tentative.

Sample	SCCP (µg/g)	R^2	Cl %	MCCP (µg/g)	R^2	Cl %	LCCP (µg/g)	R^2	Cl %
VD-1	19	0.8	58%	34	0.9	54%	4.3	0.7	50%
VD-2	214	0.8	58%	200	0.5	56%	74	*0.4*	54%
VD-3	8.6	0.7	57%	13	0.9	55%	23	*0.1*	50%
VD-4	58	0.6	59%	86	0.9	56%	14	0.5	52%
VD-5	14	0.6	59%	46	0.9	55%	7.7	0.6	48%
VD-6	136	0.8	59%	84	1.0	56%	8.6	0.5	48%
VD-7	10	0.6	59%	40	0.8	55%	13	*0.4*	43%
VD-8	5.1	0.5	58%	16	0.9	55%	14	*<0.1*	38%
VD-9	12	0.7	58%	54	0.8	55%	8.8	0.7	48%
VD-10	7.5	0.7	59%	22	0.9	55%	6.2	0.6	46%
VD-11	44	0.7	59%	165	0.8	55%	19	0.7	51%
FD-1	9.3	0.7	59%	21	0.9	55%	2.5	0.5	51%
FD-2	25	0.7	58%	47	0.8	55%	24	*0.2*	39%
FD-3	30	0.6	58%	62	0.9	55%	1.9	0.5	51%
FD-4	93	0.6	57%	259	0.9	55%	28	0.7	52%
FD-5	353	0.8	58%	283	0.9	56%	27	0.5	53%
FD-6	10	0.6	56%	498	0.6	56%	108	0.8	52%
FD-8	5.4	0.7	58%	46	0.8	55%	9.4	0.8	47%
FD-9	12	0.7	58%	29	0.9	55%	5.9	0.6	48%
FD-10	17	0.6	59%	36	0.9	55%	7.2	0.7	49%
CH-1A	1.5	0.6	59%	4.6	0.7	56%	0.9	0.6	53%
CH-1B	2.0	0.7	59%	4.0	0.9	56%	0.7	0.5	53%
CH-2A	3.0	0.8	58%	5.8	0.9	55%	2.3	*0.1*	38%
CH-2B	1.7	0.7	59%	2.6	0.9	55%	1.0	*0.4*	43%
CH-2C	2.4	0.8	58%	3.2	0.9	54%	1.6	*0.1*	37%
CH-2D	2.0	0.7	58%	3.2	0.9	55%	0.9	*0.4*	42%
CH-3	0.5	0.7	57%	0.6	0.9	54%	0.1	0.5	50%
CH-4A	7.2	0.7	58%	6.5	1.0	55%	0.9	0.5	52%
CH-4B	6.2	0.8	58%	4.7	1.0	55%	0.6	0.6	52%
CH-5	2.2	0.5	57%	4.8	1.0	55%	0.8	0.5	47%
CH-6	0.8	0.7	57%	1.4	0.9	54%	0.2	0.6	48%

Table S6. Comparisons of ΣSCCP, ΣMCCP and ΣLCCP concentrations (μg/g) in indoor dust.

		ΣSCCP (μg/g)	ΣMCCP (μg/g)	ΣLCCP (μg/g)	
Country	**Dust type**	**Median (Range)**	**Median (Range)**	**Median (Range)**	**Reference**
Sweden	Apartment	7.5 (3.2 - 18.0)			(Fridén et al., 2011)
Germany (n=11)	House	5 (4 - 27)	176 (9 - 892)		(Hilger et al., 2013)
Taiwan (n=5)	House & office	(1.2 - 31.2)			(Chen et al., 2016)
China (n=14)	Building material mall	76.7 (6.0 - 361.4)	101.7 (5.0 - 285.9)		(Shi et al., 2017)
Australia (n=1)	Office	61	180	99	(Wong et al., 2017)
Canada (n=4)	Office	55 (22 - 65)	185 (140 - 192)	134 (92 - 161)	(Wong et al., 2017)
China (n=5)	Office	580 (106 - 808)	1398 (330 - 1948)	1432 (153 - 1995)	(Wong et al., 2017)
Sweden (n=3)	Office	7 (5 - 9)	101 (67 - 158)	710 (567 - 1264)	(Wong et al., 2017)
UK (n=1)	House	93	463	157	(Wong et al., 2017)
China (n=30)	Apartment	44.1 (10.1 - 158.2)			(Liu et al., 2017)
China (n=5)	Office	50.9 (40.5 - 80.6)			(Liu et al., 2017)
China (n=22)	Commercial store	53.8 (13.3 - 173)			(Liu et al., 2017)
China (n=15)	House	46.5 (27.8 - 173)	166 (74 - 539)		(Chen et al., 2018)
China (n=30)	Houses near E-waste	412 (34.5 - 2030)	1250 (79.2 - 6510)		(Chen et al., 2018)
China (n=20)	Apartment & office	(0 - 171)			(Huang et al., 2018)
China (n=115)	House	98.7 (5.35 – 1022)	89.8 (2.10 – 725)		(Gao et al., 2018)
Canada (n=48)	House	6.2 (4 - 57)	19 (5.9 - 901.0)		(Shang et al., 2019)
Australia (n=27)	House	13* (1.0 – 42)	46 (8.8 – 380)	3.0* (<0.0014 – 15)	(He et al., 2019)
South Africa (n=20)	House	16 (5.1 - 353)	46 (13 - 498)	11 (1.9 - 108)	This study

*Average

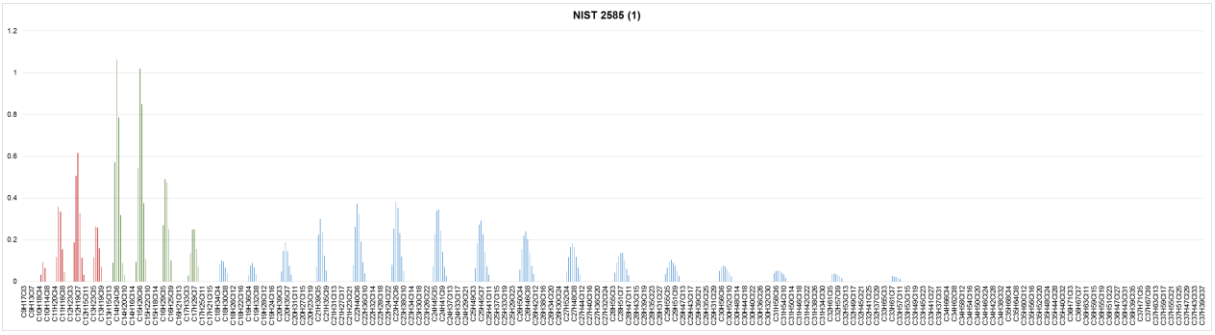

Fig. S4. Congener group patterns of CPs for NIST 2585 (1)

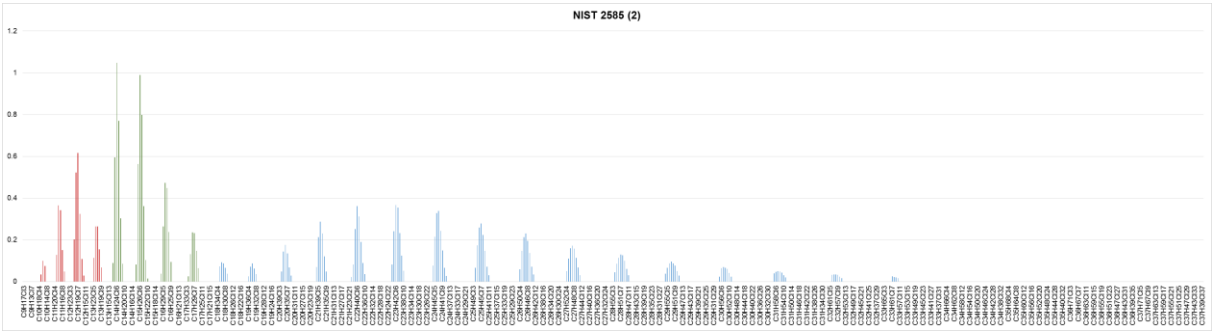

Fig. S5. Congener group patterns of CPs for NIST 2585 (2)

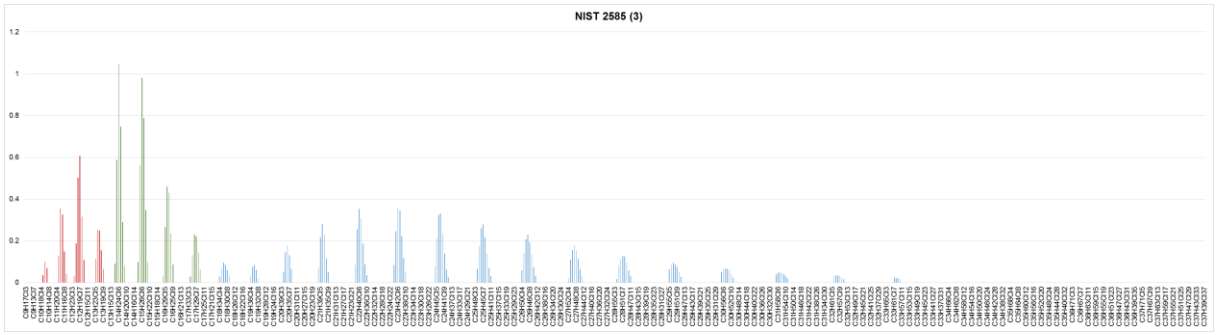

Fig. S6. Congener group patterns of CPs for NIST 2585 (3)

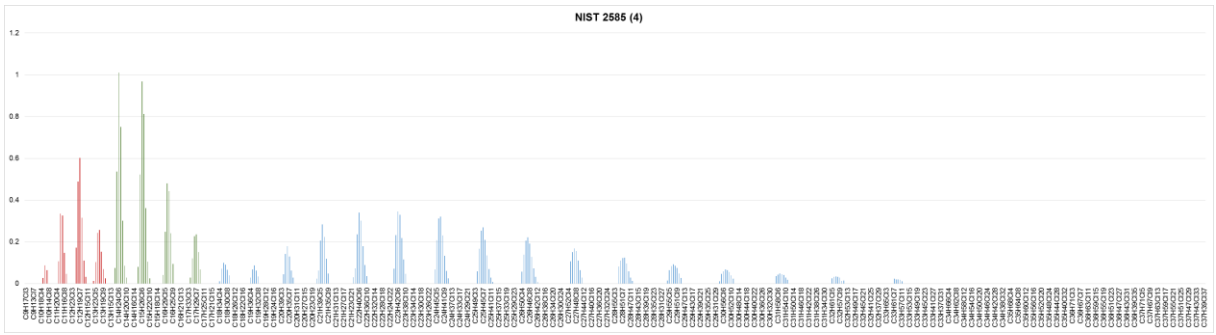

Fig. S7. Congener group patterns of CPs for NIST 2585 (4)

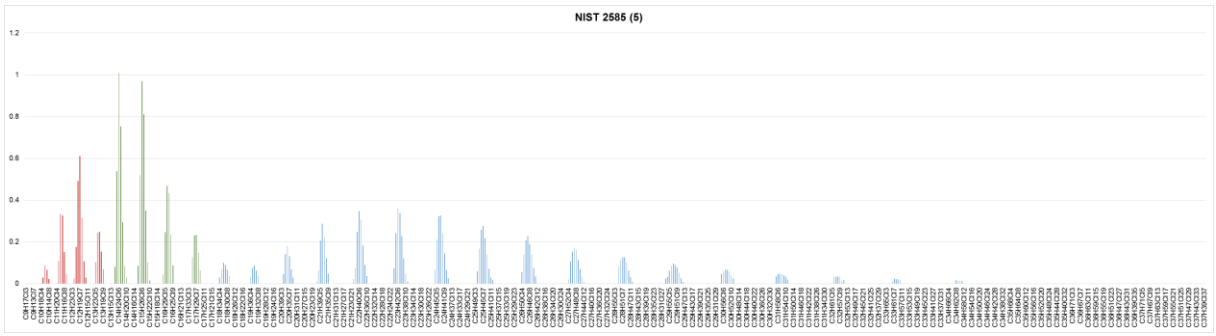

Fig. S8. Congener group patterns of CPs for NIST 2585 (5)

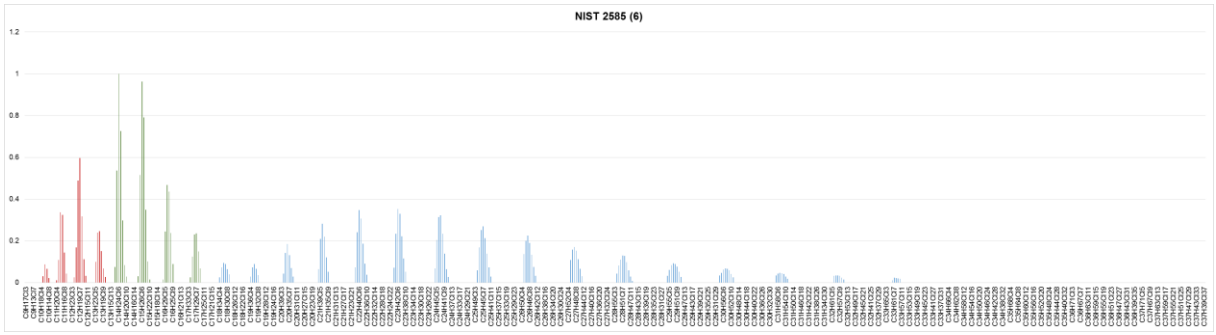

Fig. S9. Congener group patterns of CPs for NIST 2585 (6)

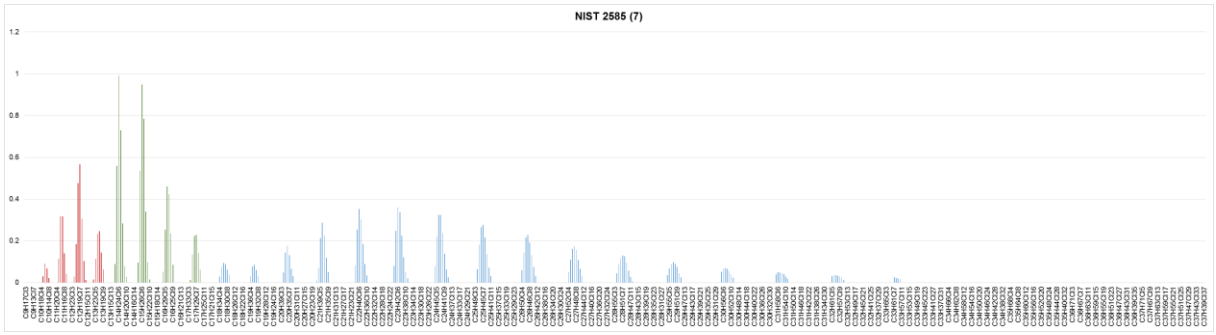

Fig. S10. Congener group patterns of CPs for NIST 2585 (7)

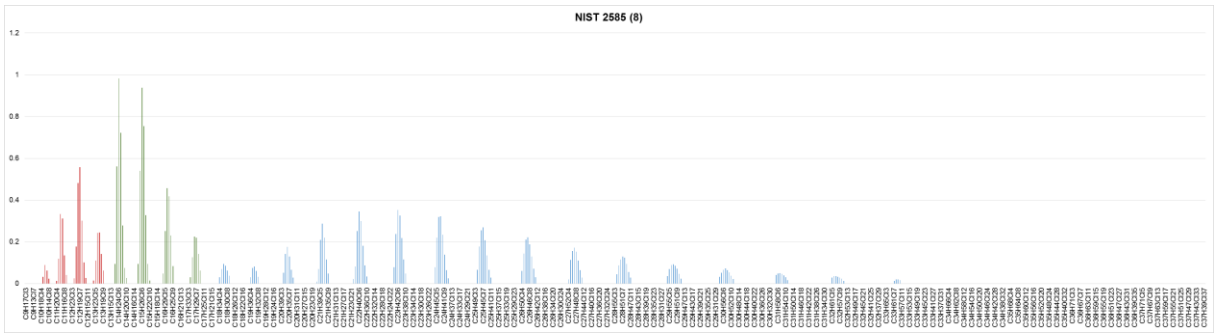

Fig. S11. Congener group patterns of CPs for NIST 2585 (8)

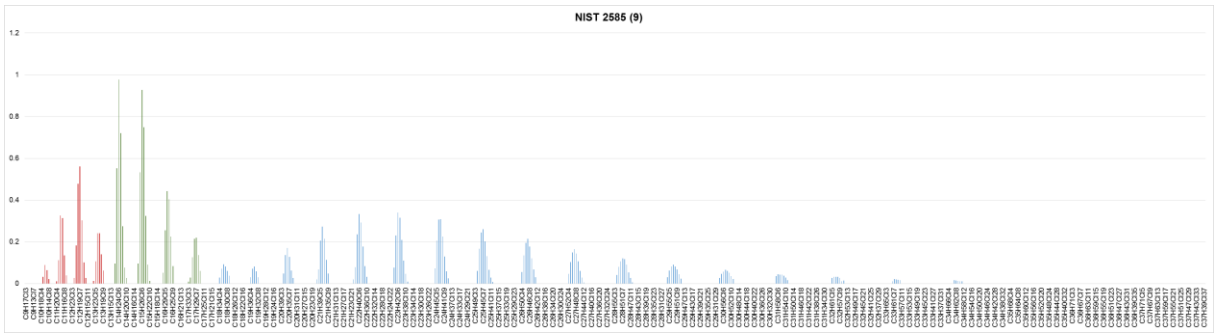

Fig. S12. Congener group patterns of CPs for NIST 2585 (9)

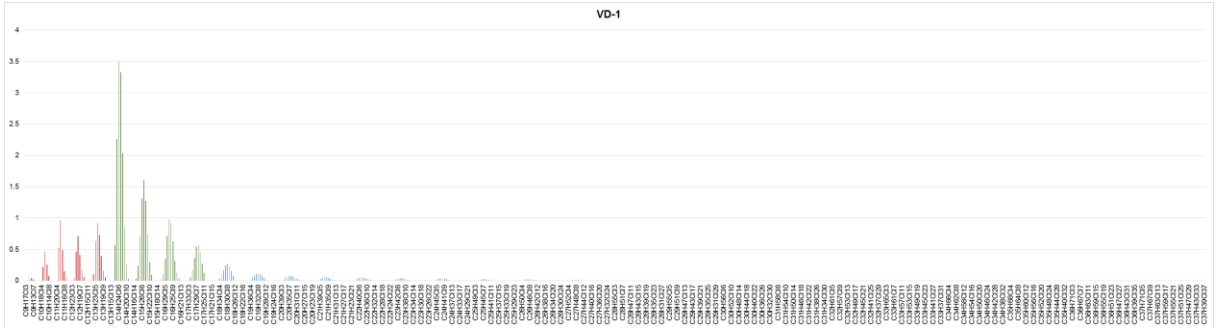

Fig. S13. Congener group patterns of CPs for VD-1

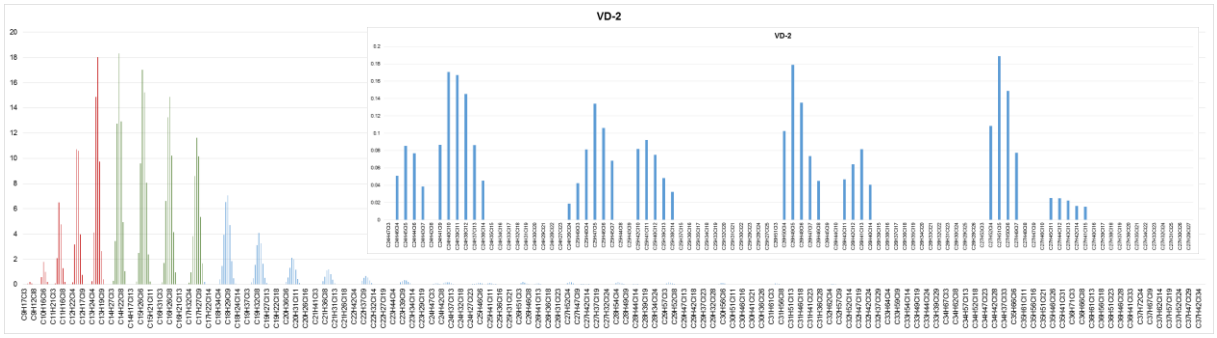

Fig. S14. Congener group patterns of CPs for VD-2, the enlarged region show the double chlorination peak observed for C_{24} to C_{27}

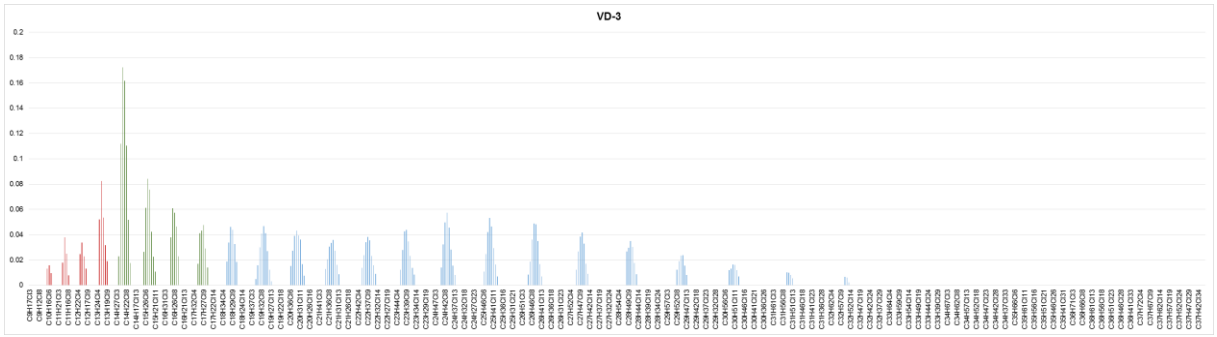

Fig. S15. Congener group patterns of CPs for VD-3

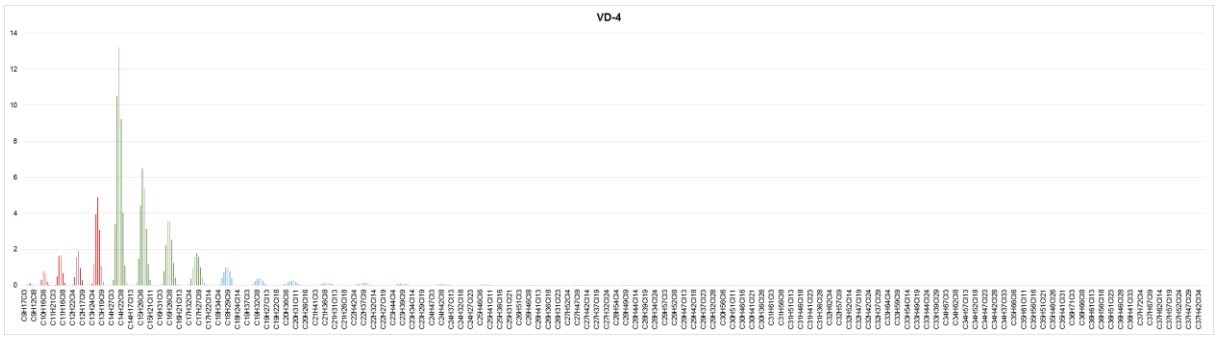

Fig. S16. Congener group patterns of CPs for VD-4

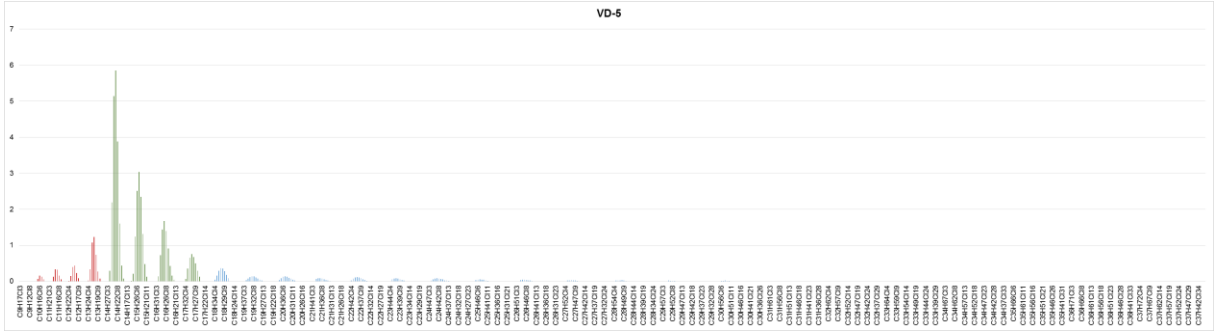

Fig. S17. Congener group patterns of CPs for VD-5

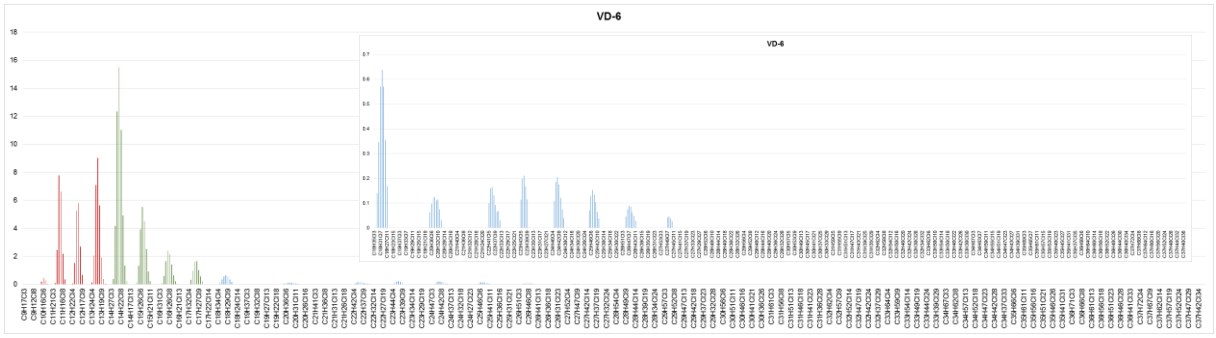

Fig. S18. Congener group patterns of CPs for VD-6, the enlarged region show the pattern for C_{18} to C_{37}

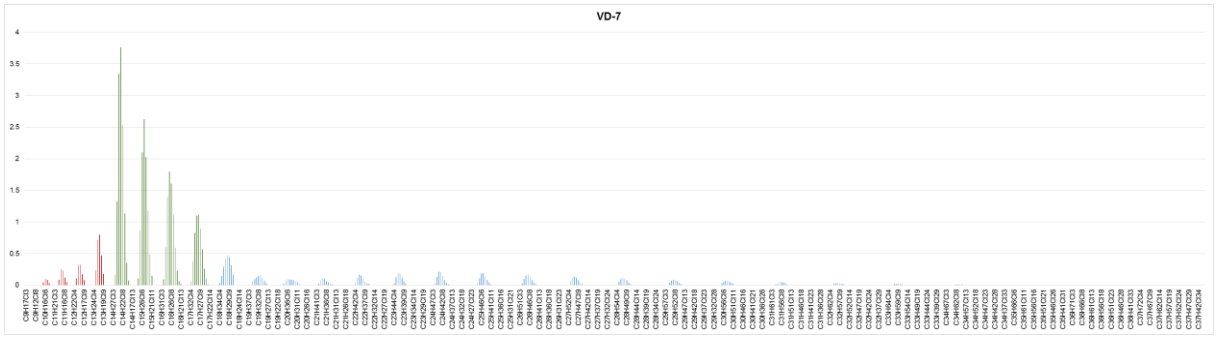

Fig. S19. Congener group patterns of CPs for VD-7

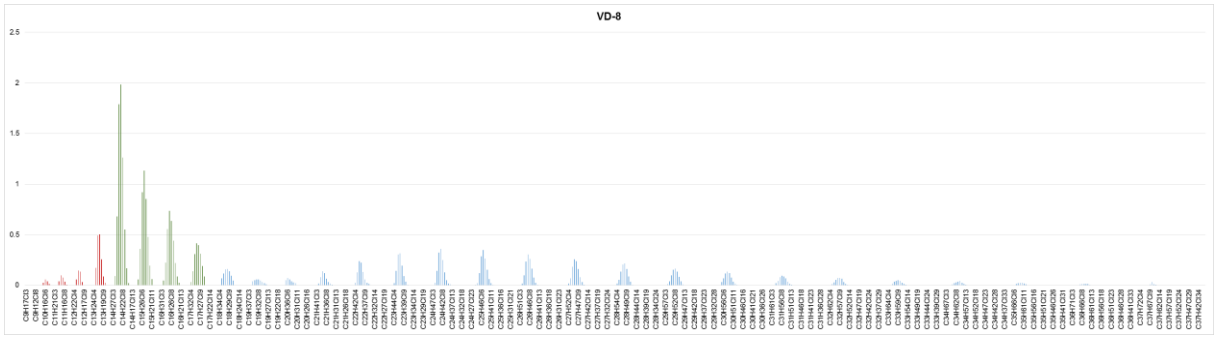

Fig. S20. Congener group patterns of CPs for VD-8

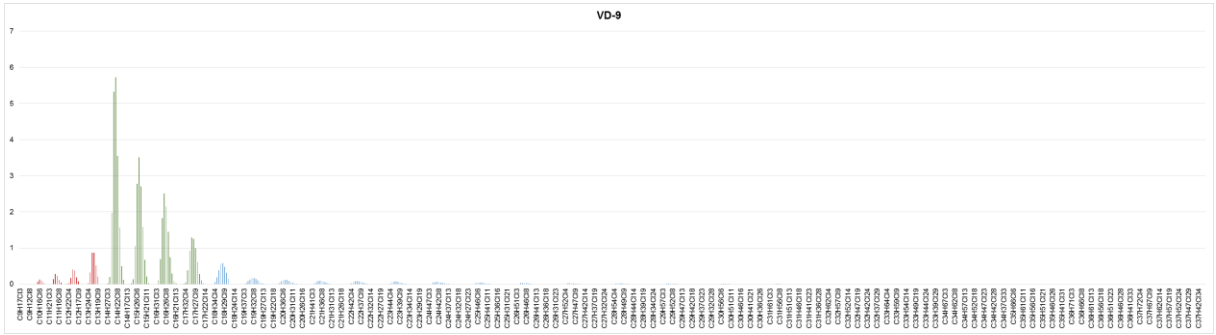

Fig. S21. Congener group patterns of CPs for VD-9

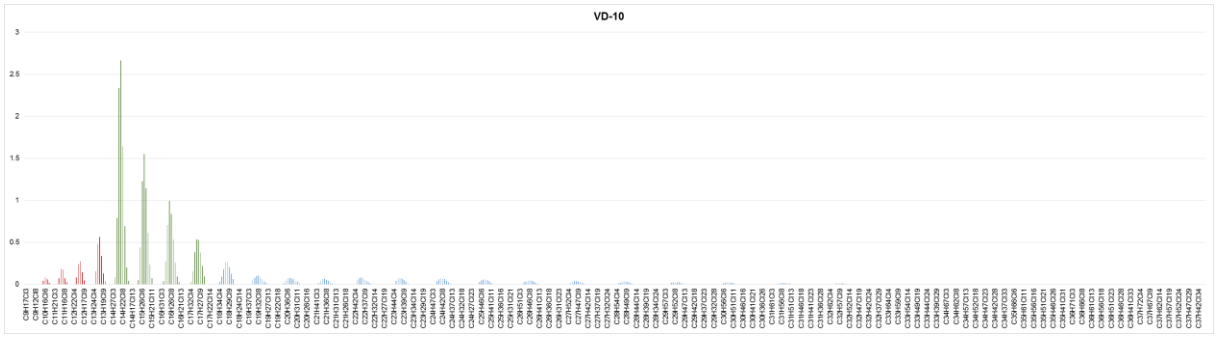

Fig. S22. Congener group patterns of CPs for VD-10

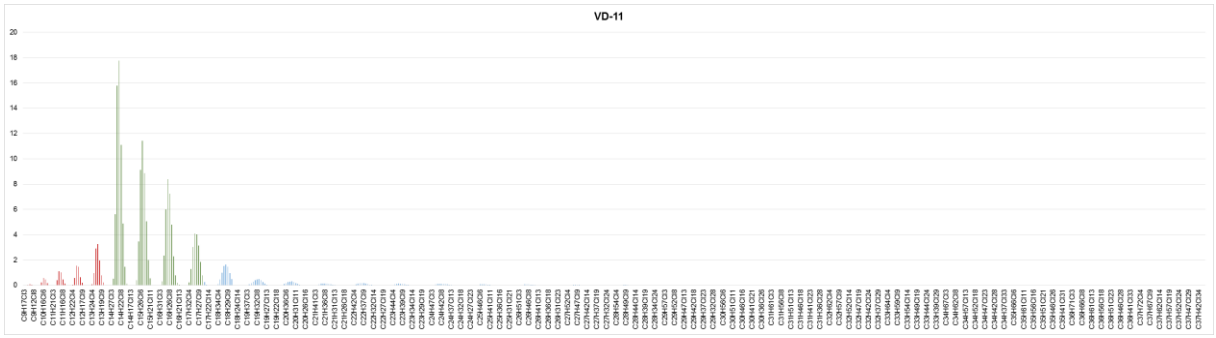

Fig. S23. Congener group patterns of CPs for VD-11

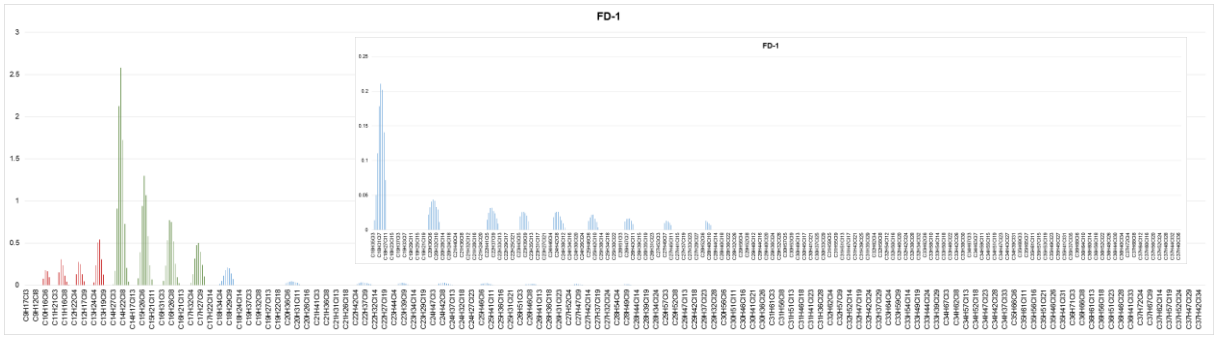

Fig. S24. Congener group patterns of CPs for FD-1, the enlarged region show the pattern for C_{18} to C_{31}

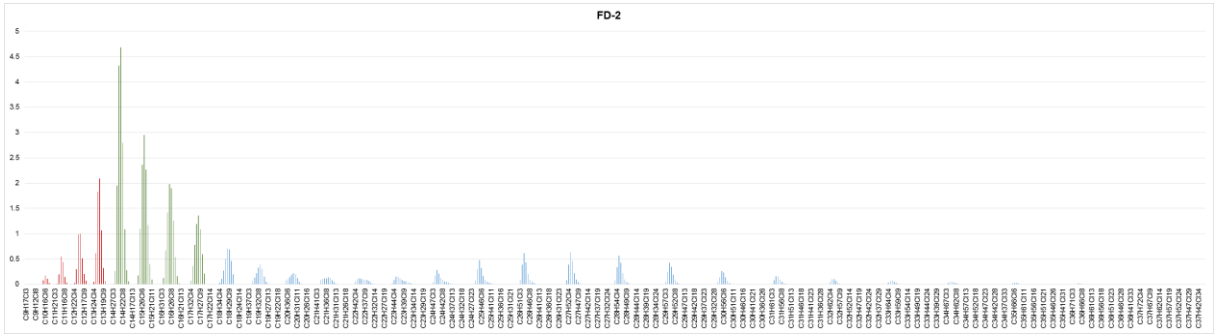

Fig. S25. Congener group patterns of CPs for FD-2

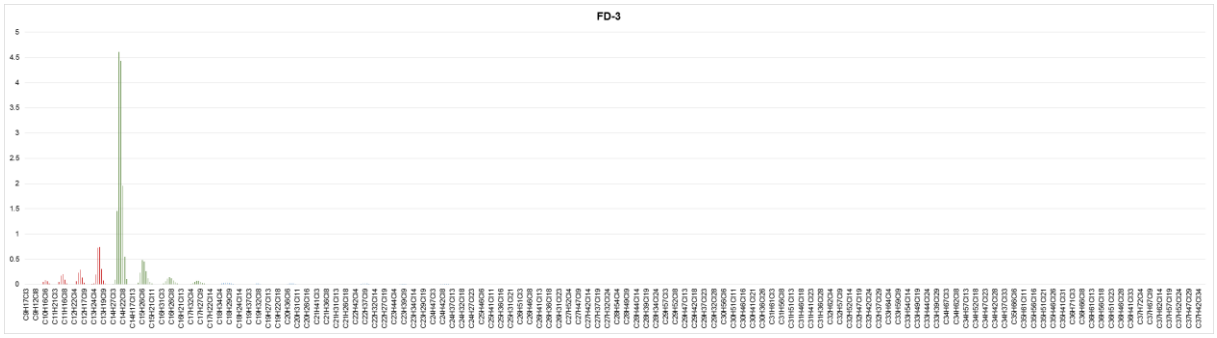

Fig. S26. Congener group patterns of CPs for FD-3

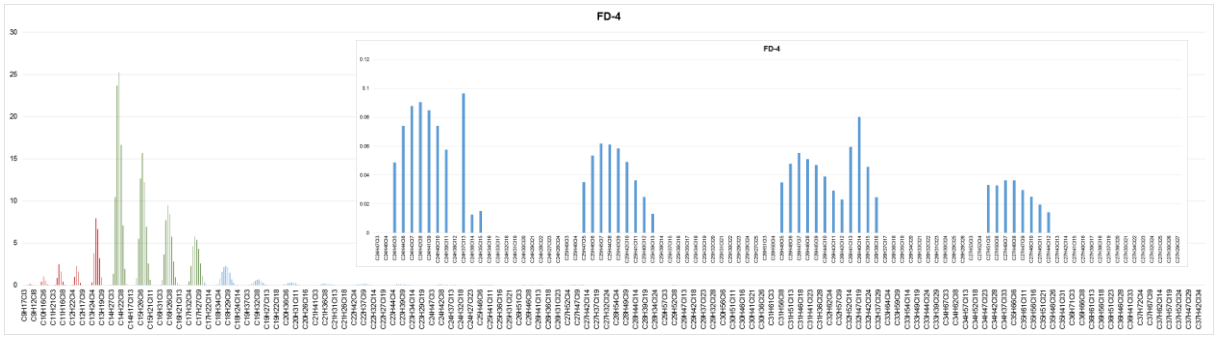

Fig. S27. Congener group patterns of CPs for FD-4, the enlarged region show the double chlorination peak observed for C_{24} to C_{27}

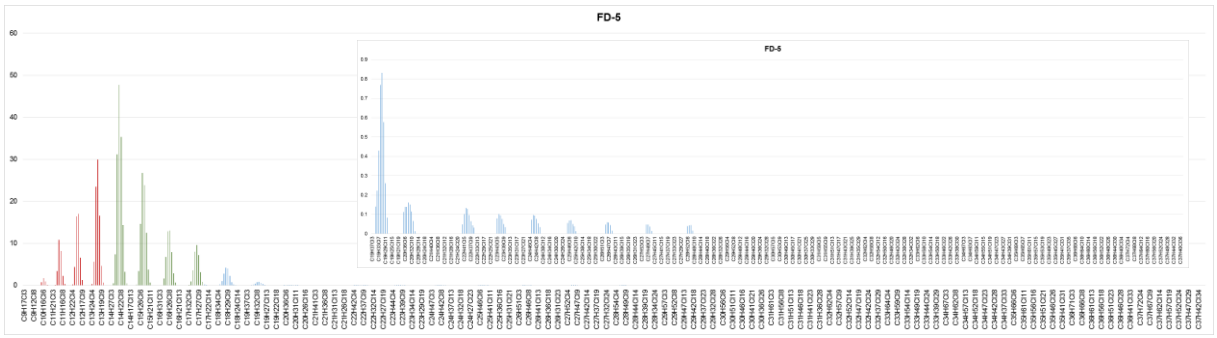

Fig. S28. Congener group patterns of CPs for FD-5, the enlarged region show the pattern for C_{19} to C_{37}

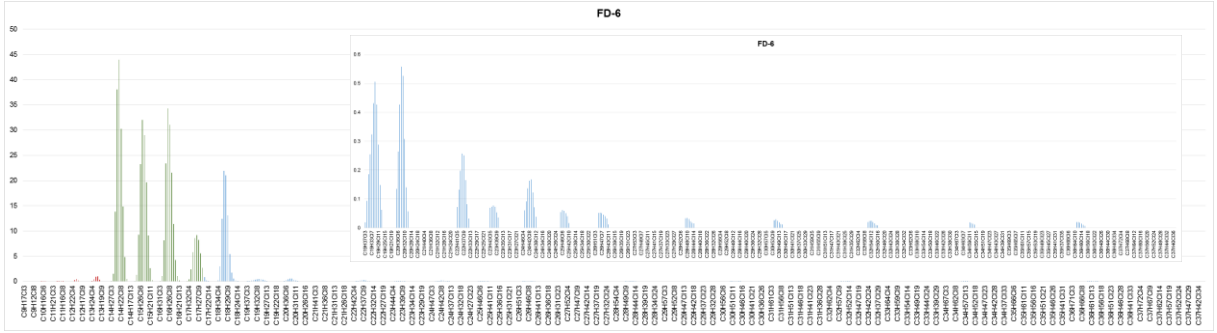

Fig. S29. Congener group patterns of CPs for FD-6, the enlarged region show the CP pattern from C_{19} to C_{37}, no C_{21} was observed and from C_{26} only even carbon chain lengths were observed.

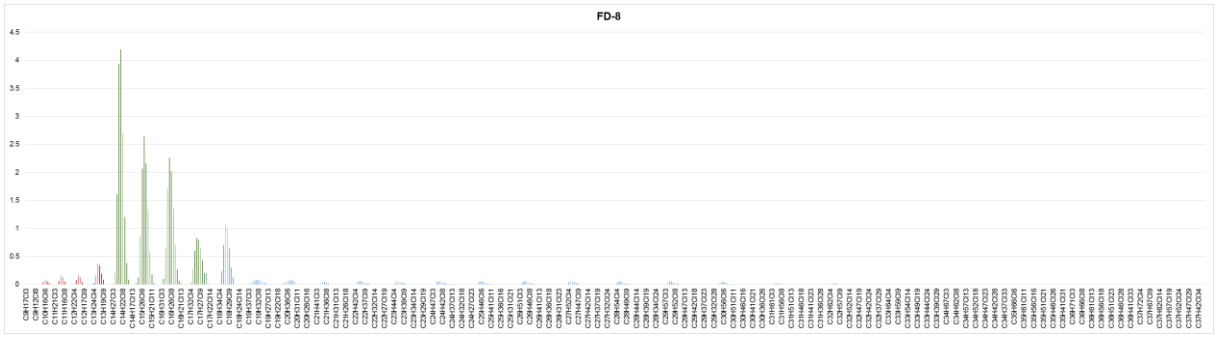

Fig. S30. Congener group patterns of CPs for FD-8

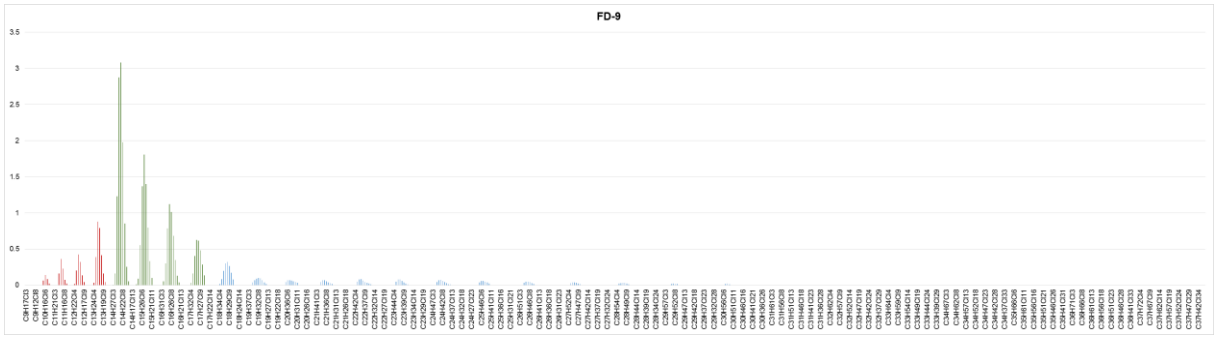

Fig. S31. Congener group patterns of CPs for FD-9

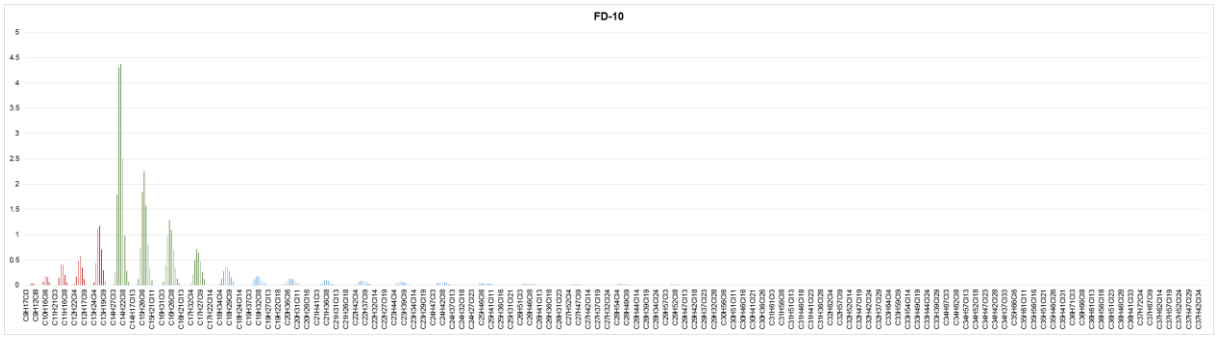

Fig. S32. Congener group patterns of CPs for FD-10

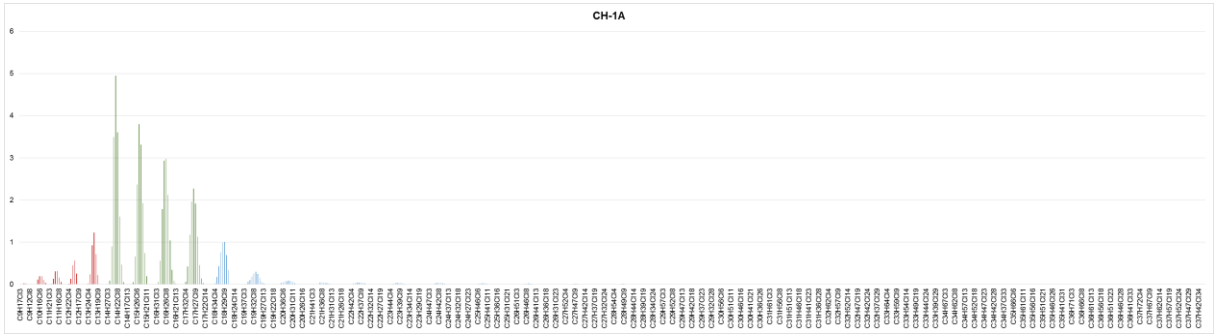

Fig. S33. Congener group patterns of CPs for CH-1A

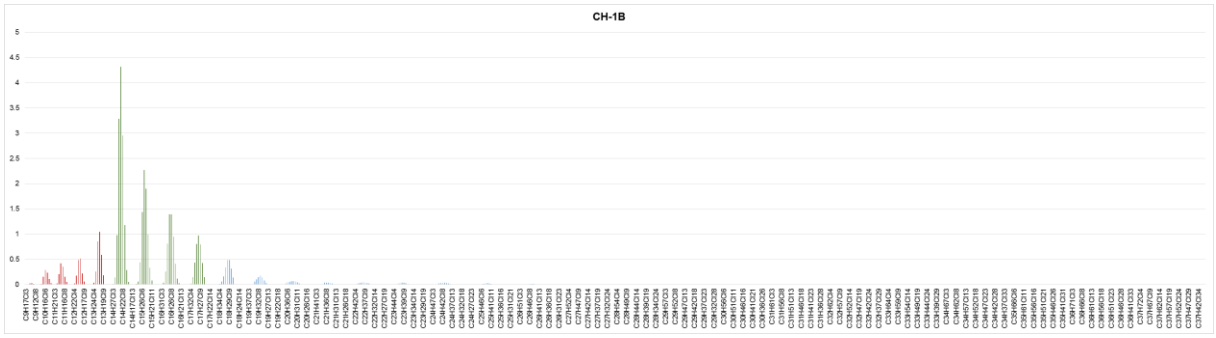

Fig. S34. Congener group patterns of CPs for CH-1B

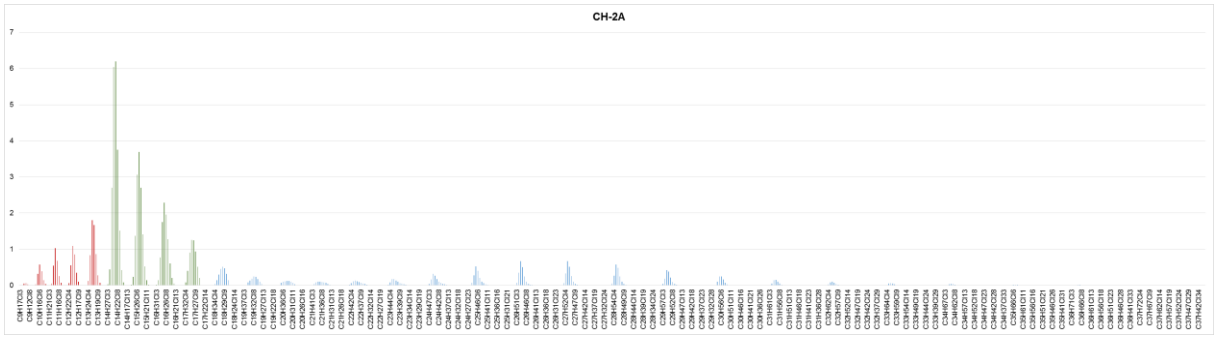

Fig. S35. Congener group patterns of CPs for CH-2A

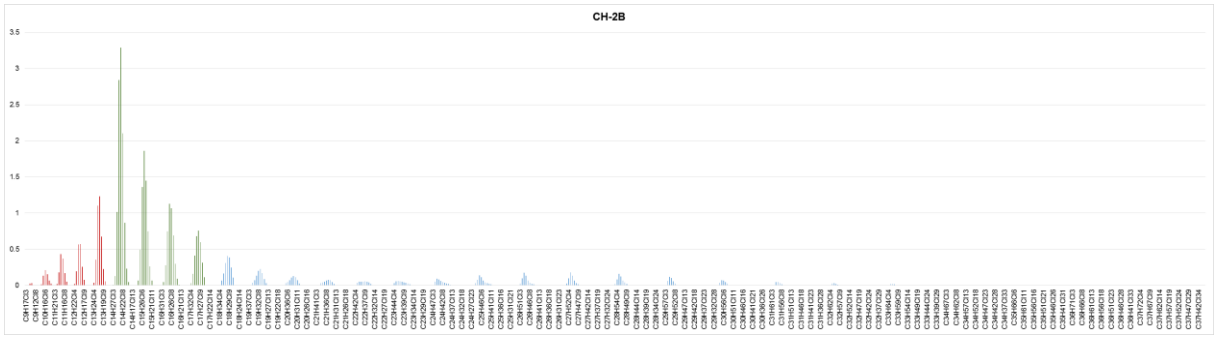

Fig. S36. Congener group patterns of CPs for CH-2B

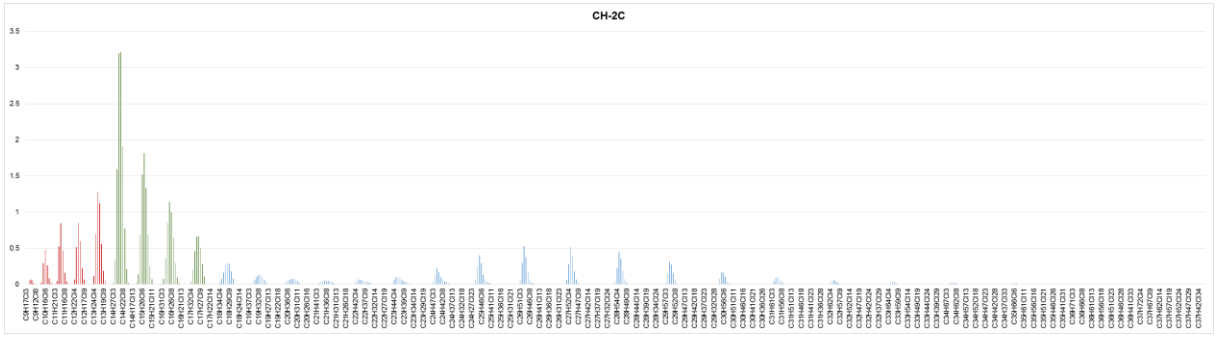

Fig. S37. Congener group patterns of CPs for CH-2C

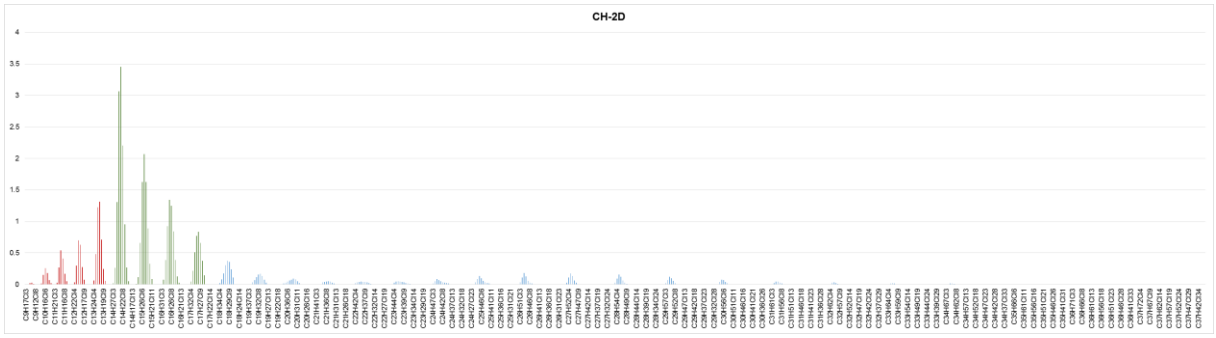

Fig. S38. Congener group patterns of CPs for CH-2D

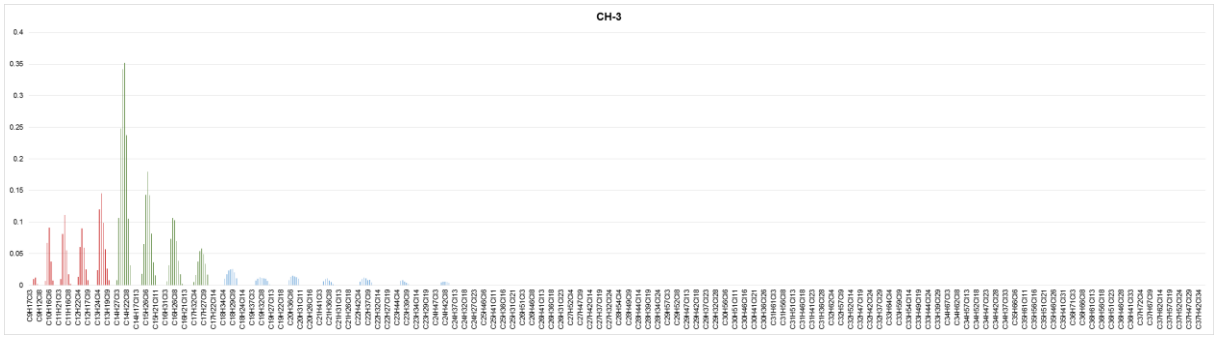

Fig. S39. Congener group patterns of CPs for CH-3

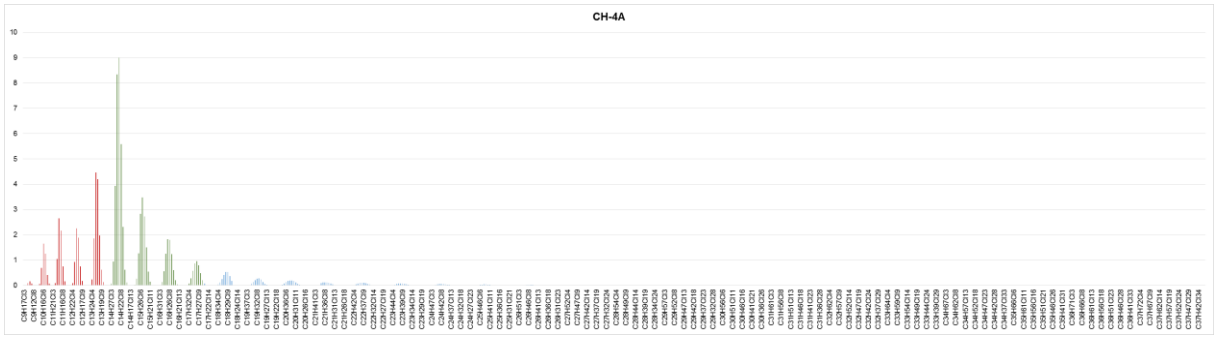

Fig. S40. Congener group patterns of CPs for CH-4A

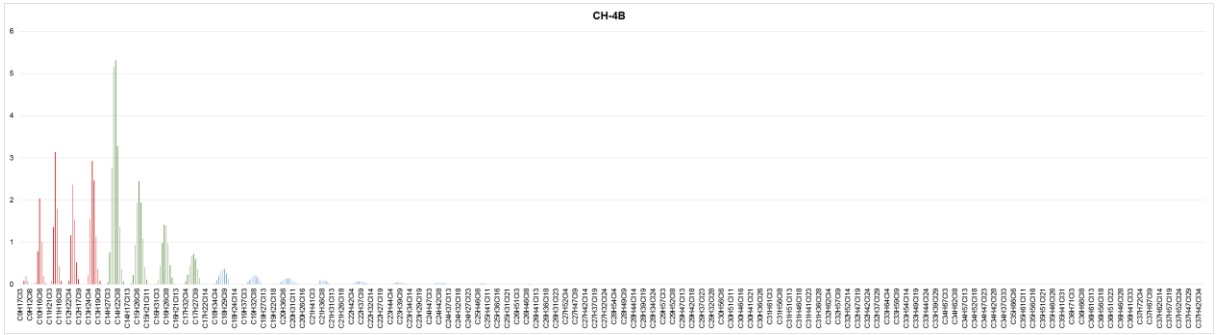

Fig. S41. Congener group patterns of CPs for CH-4B

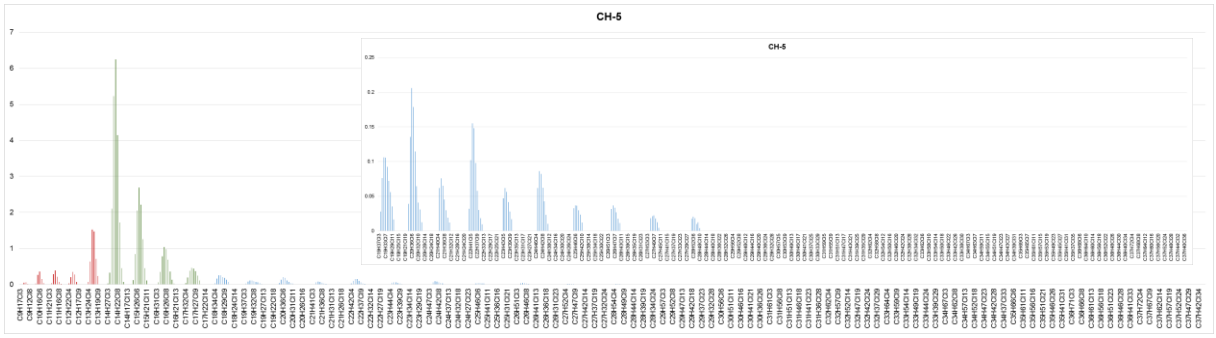

Fig. S42. Congener group patterns of CPs for CH-5, the enlarged region show the pattern for C_{19} to C_{37}

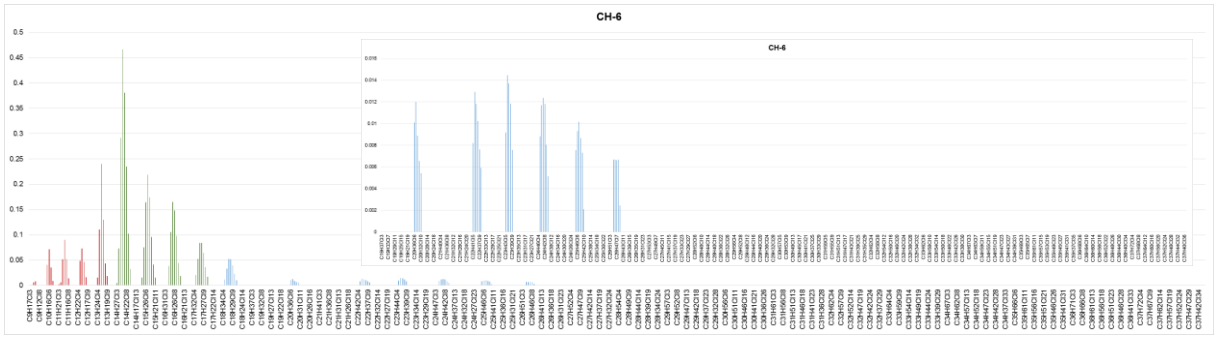

Fig. S43. Congener group patterns of CPs for CH-6, the enlarged region show the pattern for C_{19} to C_{37}

REFERENCES

Chen, H., Lam, J.C.W., Zhu, M., Wang, F., Zhou, W., Du, B., Zeng, L., Zeng, E.Y., 2018. Combined Effects of Dust and Dietary Exposure of Occupational Workers and Local Residents to Short- and Medium-Chain Chlorinated Paraffins in a Mega E-Waste Recycling Industrial Park in South China. Environ. Sci. Technol. 52, 11510–11519. doi:10.1021/acs.est.8b02625

Chen, Y.H., Chang, C.Y., Ding, W.H., 2016. Vortex-homogenized matrix solid-phase dispersion for the extraction of short chain chlorinated paraffins from indoor dust samples. J. Chromatogr. A 1472, 129–133. doi:10.1016/j.chroma.2016.10.048

Fridén, U.E., Mclachlan, M.S., Berger, U., 2011. Chlorinated paraffins in indoor air and dust: Concentrations, congener patterns, and human exposure. Environ. Int. 37, 1169–1174. doi:10.1016/j.envint.2011.04.002

Gao, W., Cao, D., Wang, Yingjun, Wu, J., Wang, Ying, Wang, Yawei, Jiang, G., 2018. External Exposure to Short- and Medium-Chain Chlorinated Paraffins for the General Population in Beijing, China. Environ. Sci. Technol. 52, 32–39. doi:10.1021/acs.est.7b04657

He, C., Brandsma, S.H., Jiang, H., O'Brien, J.W., van Mourik, L.M., Banks, A.P., Wang, X., Thai, P.K., Mueller, J.F., 2019. Chlorinated paraffins in indoor dust from Australia: Levels, congener patterns and preliminary assessment of human exposure. Sci. Total Environ. 682, 318–323. doi:10.1016/j.scitotenv.2019.05.170

Hilger, B., Fromme, H., Völkel, W., Coelhan, M., 2013. Occurrence of chlorinated paraffins in house dust samples from Bavaria, Germany. Environ. Pollut. 175, 16–21.

doi:10.1016/j.envpol.2012.12.011

Huang, X., Liu, Q., Gao, W., Wang, Y., Nie, Z., Yao, S., Jiang, G., 2018. Fast screening of short-chain chlorinated paraffins in indoor dust samples by graphene-assisted laser desorption/ionization mass spectrometry. Talanta 179, 575–582. doi:10.1016/j.talanta.2017.11.055

Liu, L.H., Ma, W.L., Liu, L.Y., Huo, C.Y., Li, W.L., Gao, C.J., Li, H.L., Li, Y.F., Chan, H.M., 2017. Occurrence, sources and human exposure assessment of SCCPs in indoor dust of northeast China. Environ. Pollut. 225, 232–243. doi:10.1016/j.envpol.2017.03.008

Shang, H., Fan, X., Kubwabo, C., Rasmussen, P., 2019. Short-chain and medium-chain chlorinated paraffins in Canadian house dust and NIST SRM 2585. Environ. Sci. Pollut. Res. doi:10.1007/s11356-018-04073-2

Shi, L., Gao, Y., Zhang, H., Geng, N., Xu, J., Zhan, F., Ni, Y., Hou, X., Chen, J., 2017. Concentrations of short- and medium-chain chlorinated paraffins in indoor dusts from malls in China: Implications for human exposure. Chemosphere 172, 103–110. doi:10.1016/j.chemosphere.2016.12.150

Wong, F., Suzuki, G., Michinaka, C., Yuan, B., Takigami, H., de Wit, C.A., 2017. Dioxin-like activities, halogenated flame retardants, organophosphate esters and chlorinated paraffins in dust from Australia, the United Kingdom, Canada, Sweden and China. Chemosphere 168, 1248–1256. doi:10.1016/j.chemosphere.2016.10.074