

厚生労働科学研究補助金（健康科学総合研究事業）
分担研究報告書

福島

単位: $\mu\text{g}/\text{m}^3$

N=65

	Median	Min	Max	25% - 75%	Mean	SD	検出率(%)
アルデヒド類							
Formaldehyde	35.9	12.8	107.3	29.0 - 49.8	40.1	15.1	100.0
Acetaldehyde	26.4	10.2	173.8	19.6 - 37.1	31.6	22.4	100.0
Acetone	44.9	17.6	424.0	32.0 - 64.0	60.1	58.2	100.0
Acrolein	ND	ND	ND	ND - ND	ND	0.0	0.0
Propionaldehyde	5.5	ND	20.8	3.4 - 8.8	6.6	4.5	96.9
Crotonaldehyde	ND	ND	112.5	ND - 5.6	4.9	14.1	44.6
n-Butyraldehyde	1.9	ND	57.7	1.4 - 5.0	4.3	7.6	87.7
Benzaldehyde	2.5	ND	40.2	ND - 8.3	4.8	6.1	69.2
iso-Valeraldehyde	ND	ND	36.3	ND - 6.0	3.5	5.5	44.6
Valeraldehyde	3.3	ND	27.4	1.6 - 6.5	5.4	6.1	84.6
Total m,o,p-Tolualdehyde	ND	ND	54.1	ND - 2.6	4.1	9.4	26.2
Hexaldehyde	10.2	ND	63.9	5.2 - 17.3	14.1	13.1	96.9
2,5-Dimethylaldehyde	ND	ND	2.3	ND - ND	0.6	0.3	3.1
Total aldehyde	155.8	51.9	514.5	113.4 - 213.5	180.7	100.8	100.0
VOC類							
2-Butanone(Ethyl Methyl Ketone)	ND	ND	37.4	ND - 5.2	3.6	5.8	47.7
Ethyl acetate	5.8	ND	313.2	ND - 21.5	33.8	66.5	70.8
n-Hexane	ND	ND	178.1	ND - 2.1	4.7	22.0	36.9
Chloroform	ND	ND	3.3	ND - 1.5	1.0	0.8	35.4
2,4-Dimethylpentane	ND	ND	2.0	ND - ND	0.7	0.5	18.5
1,2-Dichloroethane	ND	ND	2.8	ND - ND	0.6	0.3	3.1
1,1,1-Trichloroethane	ND	ND	1.8	ND - ND	0.5	0.2	4.6
n-Butanol	ND	ND	8.4	ND - 1.5	1.2	1.3	38.5
Benzene	1.1	ND	7.4	ND - 2.5	1.7	1.6	55.4
Carbon tetrachloride	ND	ND	ND	ND - ND	ND	0.0	0.0
1,2-Dichloropropane	ND	ND	ND	ND - ND	ND	0.0	0.0
Trichloroethylene	ND	ND	3.8	ND - ND	0.6	0.5	3.1
n-Heptane	ND	ND	39.9	ND - 3.7	3.6	7.0	47.7
2-Pentanone(Methylisobutylketone)	ND	ND	5.3	ND - ND	0.8	0.9	18.5
Toluene	15.6	ND	87.4	8.0 - 23.1	17.4	13.8	95.4
Chlorodibromomethane	ND	ND	ND	ND - ND	ND	0.0	0.0
Butyl acetate	1.9	ND	12.9	ND - 4.1	2.6	2.6	58.5
n-Octane	ND	ND	37.7	ND - 3.9	4.1	7.4	41.5
Tetrachloroethylene	ND	ND	21.4	ND - ND	0.9	2.7	4.6
Ethylbenzene	2.7	ND	15.7	1.2 - 4.6	3.6	3.5	78.5
Total m,o,p-Xylene	5.9	ND	73.5	2.0 - 11.8	9.3	12.5	80.0
Styrene	ND	ND	2.2	ND - ND	0.5	0.2	3.1
n-Nonane	2.1	ND	57.6	ND - 8.7	7.6	12.2	64.6
alpha-Pinene	10.2	ND	649.1	ND - 54.2	44.6	91.4	67.7
Total Trimethylbenzene	2.8	ND	66.9	ND - 7.6	6.4	9.9	73.8
n-Decane	ND	ND	43.4	ND - ND	3.9	9.2	21.5
p-Dichlorobenzene	3.4	ND	1337.8	ND - 37.9	91.6	220.7	64.6
Limonene	7.9	ND	101.6	1.6 - 20.0	15.3	21.9	78.5
n-Undecane	ND	ND	82.6	ND - 8.4	9.7	18.4	49.2
Total VOC	201.7	16.0	1393.9	97.2 - 324.4	272.3	262.8	100.0

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分担研究報告書

名古屋

単位: $\mu\text{g}/\text{m}^3$

N=57

	Median	Min	Max	25% - 75%	Mean	SD	検出率(%)
アルデヒド類							
Formaldehyde	34.2	15.8	76.1	26.6 - 43.5	36.2	12.7	100.0
Acetaldehyde	16.6	6.7	80.0	10.8 - 26.8	22.4	15.9	100.0
Acetone	21.6	8.0	113.0	15.1 - 31.0	28.1	21.3	100.0
Acrolein	ND	ND	ND	ND - ND	ND	0.0	12.3
Propionaldehyde	4.7	1.4	36.7	3.4 - 7.0	6.2	5.1	100.0
Crotonaldehyde	ND	ND	8.4	ND - ND	0.6	1.0	13.8
n-Butyraldehyde	1.1	ND	6.5	ND - 1.9	1.5	1.5	63.1
Benzaldehyde	1.2	ND	44.6	ND - 2.3	2.2	5.7	58.5
iso-Valeraldehyde	ND	ND	3.4	ND - ND	0.5	0.4	13.8
Valeraldehyde	1.2	ND	11.2	ND - 2.5	1.9	2.2	60.0
Total m,o,p-Tolualdehyde	ND	ND	1.6	ND - ND	1.1	1.6	30.8
Hexaldehyde	5.0	ND	42.5	3.7 - 11.1	8.6	8.7	95.4
2,5-Dimethylaldehyde	ND	ND	1.5	ND - ND	0.5	0.1	13.8
Total aldehyde	95.3	43.6	283.6	72.2 - 121.3	110.9	58.0	100.0
VOC類							
2-Butanone(Ethyl Methyl Ketone)	2.2	ND	10.0	1.4 - 3.4	2.6	1.8	89.2
Ethyl acetate	6.1	ND	36.8	3.7 - 12.0	8.6	7.4	96.9
n-Hexane	ND	ND	7.8	ND - 1.3	1.2	1.5	33.8
Chloroform	ND	ND	3.0	ND - ND	0.6	0.3	15.4
2,4-Dimethylpentane	ND	ND	ND	ND - ND	ND	0.0	12.3
1,2-Dichloroethane	ND	ND	ND	ND - ND	ND	0.0	12.3
1,1,1-Trichloroethane	ND	ND	4.4	ND - ND	0.6	0.5	15.4
n-Butanol	ND	ND	9.5	ND - 1.5	1.3	1.4	52.3
Benzene	ND	ND	3.0	ND - 1.2	0.9	0.7	38.5
Carbon tetrachloride	ND	ND	ND	ND - ND	ND	0.0	12.3
1,2-Dichloropropane	ND	ND	ND	ND - ND	ND	0.0	12.3
Trichloroethylene	ND	ND	ND	ND - ND	ND	0.0	12.3
n-Heptane	ND	ND	24.2	ND - ND	1.6	3.6	30.8
2-Pentanone(Methylisobutylketone)	ND	ND	5.4	ND - 1.2	1.0	1.0	40.0
Toluene	13.5	3.2	39.2	9.8 - 21.5	16.4	9.1	100.0
Chlorodibromomethane	ND	ND	ND	ND - ND	ND	0.0	12.3
Butyl acetate	1.8	ND	9.5	1.0 - 2.8	2.4	2.1	80.0
n-Octane	ND	ND	17.5	ND - ND	1.4	2.6	33.8
Tetrachloroethylene	ND	ND	2.2	ND - ND	0.6	0.3	15.4
Ethylbenzene	2.9	ND	12.4	1.7 - 4.1	3.4	2.4	98.5
Total m,o,p-Xylene	4.9	ND	38.7	2.7 - 10.1	7.3	7.0	98.5
Styrene	ND	ND	ND	ND - ND	ND	0.0	12.3
n-Nonane	ND	ND	35.2	ND - 1.5	2.7	5.7	38.5
alpha-Pinene	8.0	ND	1052.7	2.6 - 34.4	41.9	138.1	87.7
Total Trimethylbenzene	3.0	ND	32.6	2.1 - 5.2	5.3	7.0	81.5
n-Decane	2.8	ND	28.2	1.9 - 6.0	5.4	6.0	92.3
p-Dichlorobenzene	7.8	ND	1407.5	1.4 - 77.2	115.6	271.2	86.2
Limonene	7.5	ND	108.6	4.4 - 23.1	18.8	24.6	100.0
n-Undecane	1.7	ND	44.3	1.2 - 5.8	6.5	10.5	89.2
Total VOC	119.8	25.9	1527.1	7ND - 314.4	249.7	317.0	100.0

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大阪

単位: $\mu\text{g}/\text{m}^3$

N=78

	Median	Min	Max	25% - 75%	Mean	SD	検出率(%)
アルデヒド類							
Formaldehyde	30.0	ND	153.0	1.6 - 46.8	31.7	28.6	76.9
Acetaldehyde	18.0	ND	83.4	6.6 - 29.2	20.1	17.2	80.8
Acetone	27.0	ND	510.1	13.9 - 44.2	36.6	62.6	87.2
Acrolein	ND	ND	ND	ND - ND	ND	0.0	0.0
Propionaldehyde	6.6	ND	27.0	ND - 14.8	8.6	7.9	66.7
Crotonaldehyde	2.7	ND	16.0	ND - 9.1	5.1	4.9	56.4
n-Butyraldehyde	2.0	ND	19.5	ND - 6.1	4.0	4.4	53.8
Benzaldehyde	3.2	ND	25.2	ND - 11.0	6.3	6.7	62.8
iso-Valeraldehyde	2.6	ND	22.7	ND - 9.9	5.6	6.1	52.6
Valeraldehyde	3.9	ND	201.2	ND - 11.0	9.1	23.2	69.2
Total m,o,p-Tolualdehyde	1.8	ND	14.7	ND - 3.9	2.7	2.7	51.3
Hexaldehyde	8.4	ND	104.4	4.3 - 16.3	12.9	15.5	89.7
2,5-Dimethylaldehyde	ND	ND	3.9	ND - ND	0.7	0.6	12.8
Total aldehyde	121.1	7.0	661.0	66.1 - 206.5	144.0	116.3	100.0
VOC類							
2-Butanone(Ethyl Methyl Ketone)	ND	ND	5.2	ND - ND	0.8	0.8	12.8
Ethyl acetate	ND	ND	147.4	ND - ND	3.5	16.8	19.2
n-Hexane	ND	ND	12.7	ND - ND	0.8	1.5	9.0
Chloroform	ND	ND	4.9	ND - ND	0.9	0.9	23.1
2,4-Dimethylpentane	ND	ND	2.0	ND - ND	0.6	0.4	15.4
1,2-Dichloroethane	ND	ND	2.5	ND - ND	0.6	0.3	5.1
1,1,1-Trichloroethane	ND	ND	4.2	ND - ND	0.6	0.5	5.1
n-Butanol	ND	ND	2.6	ND - ND	0.6	0.4	9.0
Benzene	1.1	ND	5.2	ND - 2.2	1.5	1.2	57.7
Carbon tetrachloride	ND	ND	1.3	ND - ND	0.5	0.1	2.6
1,2-Dichloropropane	ND	ND	ND	ND - ND	ND	0.0	0.0
Trichloroethylene	ND	ND	ND	ND - ND	ND	0.0	0.0
n-Heptane	ND	ND	23.1	ND - 1.2	1.5	3.0	37.2
2-Pentanone(Methylisobutylketone)	ND	ND	10.7	ND - 0.6	1.4	2.2	24.4
Toluene	8.9	ND	43.4	5.1 - 14.2	10.5	7.9	92.3
Chlorodibromomethane	ND	ND	ND	ND - ND	ND	0.0	0.0
Butyl acetate	2.4	ND	48.2	1.3 - 4.0	3.4	5.6	82.1
n-Octane	ND	ND	6.2	ND - ND	0.9	1.2	12.8
Tetrachloroethylene	ND	ND	2.6	ND - ND	0.5	0.2	1.3
Ethylbenzene	1.6	ND	15.5	1.1 - 2.7	2.1	2.0	82.1
Total m,o,p-Xylene	3.2	ND	27.4	2.2 - 5.3	4.4	4.2	94.9
Styrene	ND	ND	3.2	ND - ND	0.6	0.4	5.1
n-Nonane	ND	ND	3.7	ND - ND	0.7	0.6	9.0
alpha-Pinene	8.4	ND	498.9	2.0 - 31.8	34.5	73.8	92.3
Total Trimethylbenzene	ND	ND	6.4	ND - 2.1	1.3	1.4	29.5
n-Decane	ND	ND	7.6	ND - ND	0.8	1.2	9.0
p-Dichlorobenzene	1.1	ND	167.2	ND - 14.8	12.7	25.0	51.3
Limonene	5.4	ND	116.6	2.8 - 12.0	12.2	20.5	94.9
n-Undecane	ND	ND	6.6	ND - 1.1	0.9	1.0	28.2
Total VOC	75.1	17.2	622.4	47.7 - 114.5	101.0	93.2	100.0

厚生労働科学研究補助金（健康科学総合研究事業）
分担研究報告書

岡山

単位: $\mu\text{g}/\text{m}^3$

N=71

	Median	Min	Max	25% - 75%	Mean	SD	検出率(%)
アルデヒド類							
Formaldehyde	36.2	12.2	112.4	24.8 - 49.0	39.7	19.9	100.0
Acetaldehyde	15.5	1.3	208.9	11.1 - 24.1	22.9	26.6	100.0
Acetone	27.7	10.8	104.8	19.9 - 36.6	31.7	15.9	100.0
Acrolein	ND	ND	6.1	ND - ND	0.6	0.7	1.4
Propionaldehyde	6.3	ND	127.1	4.2 - 11.9	10.3	15.7	95.8
Crotonaldehyde	ND	ND	29.9	ND - 4.3	3.2	5.5	29.6
n-Butyraldehyde	1.2	ND	12.8	ND - 2.6	2.3	2.7	60.6
Benzaldehyde	1.6	ND	67.8	ND - 5.6	6.1	11.4	69.0
iso-Valeraldehyde	ND	ND	51.8	ND - 2.0	4.1	8.9	26.8
Valeraldehyde	1.3	ND	33.2	ND - 2.9	3.6	6.2	60.6
Total m,o,p-Tolualdehyde	ND	ND	18.9	ND - 2.6	3.0	4.9	29.6
Hexaldehyde	5.0	ND	49.0	2.6 - 12.6	9.8	10.8	93.0
2,5-Dimethylaldehyde	ND	ND	12.6	ND - ND	0.7	1.5	5.6
Total aldehyde	104.8	47.5	397.1	75.3 - 186.2	138.3	83.5	100.0
VOC類							
2-Butanone(Ethyl Methyl Ketone)	ND	ND	13.3	ND - 2.8	2.1	2.6	47.9
Ethyl acetate	2.9	ND	37.2	ND - 6.5	5.4	7.5	70.4
n-Hexane	ND	ND	38.0	ND - 1.9	2.2	5.0	38.0
Chloroform	ND	ND	5.9	ND - ND	0.9	1.1	14.1
2,4-Dimethylpentane	ND	ND	2.9	ND - ND	0.6	0.3	2.8
1,2-Dichloroethane	ND	ND	ND	ND - ND	ND	0.0	0.0
1,1,1-Trichloroethane	ND	ND	1.4	ND - ND	0.5	0.1	4.2
n-Butanol	ND	ND	11.0	ND - 1.5	1.1	1.5	35.2
Benzene	1.3	ND	21.7	ND - 4.8	3.2	3.9	56.3
Carbon tetrachloride	ND	ND	ND	ND - ND	ND	0.0	0.0
1,2-Dichloropropane	ND	ND	ND	ND - ND	ND	0.0	0.0
Trichloroethylene	ND	ND	3.3	ND - ND	0.6	0.4	4.2
n-Heptane	ND	ND	129.6	ND - 2.0	4.0	15.7	29.6
2-Pentanone(Methylisobutylketone)	ND	ND	12.1	ND - ND	1.0	1.7	18.3
Toluene	11.4	2.7	100.3	8.1 - 20.3	16.6	14.9	100.0
Chlorodibromomethane	ND	ND	6.0	ND - ND	0.6	0.7	1.4
Butyl acetate	1.3	ND	29.2	ND - 3.6	2.8	4.2	56.3
n-Octane	ND	ND	45.5	ND - 1.1	2.1	5.9	26.8
Tetrachloroethylene	ND	ND	1.8	ND - ND	0.5	0.2	2.8
Ethylbenzene	2.3	ND	24.8	1.5 - 4.1	3.2	3.4	85.9
Total m,o,p-Xylene	4.3	ND	101.1	1.5 - 8.2	7.2	13.1	76.1
Styrene	ND	ND	52.7	ND - ND	1.3	6.2	5.6
n-Nonane	ND	ND	160.0	ND - 3.2	6.6	20.0	47.9
alpha-Pinene	6.7	ND	154.7	2.2 - 24.1	16.2	23.2	84.5
Total Trimethylbenzene	3.1	ND	103.0	2.2 - 8.0	7.6	15.4	80.3
n-Decane	ND	ND	84.7	ND - 6.1	6.5	13.4	100.0
p-Dichlorobenzene	2.3	ND	241.6	1.0 - 12.7	20.2	44.2	76.1
Limonene	11.3	ND	601.6	5.2 - 3ND	30.5	73.7	94.4
n-Undecane	1.5	ND	101.3	ND - 4.5	5.3	13.5	59.2
Total VOC	97.7	29.5	1147.4	62.6 - 181.9	150.4	167.7	100.0

厚生労働科学研究補助金（健康科学総合研究事業）
分担研究報告書

北九州

単位：μg/m³

N=50

	Median	Min	Max	25% - 75%	Mean	SD	検出率(%)
アルデヒド類							
Formaldehyde	44.7	9.2	164.4	33.1 - 54.8	48.9	26.0	100.0
Acetaldehyde	19.3	2.2	62.0	12.7 - 31.5	23.0	14.3	100.0
Acetone	68.1	ND	337.1	55.6 - 116.9	100.3	80.2	98.0
Acrolein	ND	ND	ND	ND - ND	0.5	0.0	0.0
Propionaldehyde	16.5	8.9	35.4	14.5 - 19.9	17.6	5.3	100.0
Crotonaldehyde	10.8	1.7	26.1	8.9 - 12.9	11.0	4.3	100.0
n-Butyraldehyde	8.2	ND	109.5	5.5 - 15.5	12.1	15.5	98.0
Benzaldehyde	17.4	4.3	100.3	12.3 - 35.4	25.5	20.2	100.0
iso-Valeraldehyde	14.6	1.9	89.8	7.4 - 28.6	21.1	18.8	100.0
Valeraldehyde	11.8	ND	64.6	6.0 - 22.0	16.0	14.7	90.0
Total m,o,p-Tolualdehyde	ND	ND	222.9	ND - ND	6.4	31.8	8.0
Hexaldehyde	9.2	2.9	108.0	5.7 - 16.9	14.6	17.0	100.0
2,5-Dimethylaldehyde	ND	ND	19.6	ND - ND	1.0	2.7	6.0
Total aldehyde	271.4	166.8	647.8	221.5 - 365.5	298.4	110.4	100.0
VOC類							
2-Butanone(Ethyl Methyl Ketone)	ND	ND	ND	ND - ND	ND	0.0	0.0
Ethyl acetate	ND	ND	36.6	ND - ND	1.9	6.8	4.0
n-Hexane	ND	ND	66.0	ND - ND	1.9	9.3	6.0
Chloroform	ND	ND	2.5	ND - ND	0.6	0.4	6.0
2,4-Dimethylpentane	ND	ND	ND	ND - ND	ND	0.0	0.0
1,2-Dichloroethane	ND	ND	6.5	ND - ND	0.7	0.9	6.0
1,1,1-Trichloroethane	ND	ND	ND	ND - ND	ND	0.0	0.0
n-Butanol	ND	ND	ND	ND - ND	ND	0.0	0.0
Benzene	0.8	ND	4.6	ND - 2.1	1.4	1.1	50.0
Carbon tetrachloride	ND	ND	1.4	ND - ND	0.6	0.2	14.0
1,2-Dichloropropane	ND	ND	ND	ND - ND	ND	0.0	0.0
Trichloroethylene	ND	ND	ND	ND - ND	ND	0.0	0.0
n-Heptane	ND	ND	19.7	ND - 1.3	1.5	3.0	30.0
2-Pentanone(Methylisobutylketone)	ND	ND	7.9	ND - 1.2	1.1	1.3	32.0
Toluene	10.3	4.6	29.6	8.6 - 14.6	11.8	5.6	100.0
Chlorodibromomethane	ND	ND	ND	ND - ND	ND	0.0	0.0
Butyl acetate	2.7	ND	13.0	ND - 5.6	3.7	3.5	70.0
n-Octane	ND	ND	11.7	ND - 1.2	1.4	2.4	26.0
Tetrachloroethylene	ND	ND	4.7	ND - ND	0.6	0.6	4.0
Ethylbenzene	2.5	ND	12.7	1.4 - 4.4	3.3	2.6	86.0
Total m,o,p-Xylene	4.6	ND	32.3	3.0 - 8.0	6.9	6.6	92.0
Styrene	ND	ND	5.5	ND - ND	0.6	0.7	6.0
n-Nonane	ND	ND	22.1	ND - 1.8	2.3	4.0	34.0
alpha-Pinene	5.3	ND	411.4	1.2 - 19.7	27.2	64.9	78.0
Total Trimethylbenzene	ND	ND	36.6	ND - 3.1	2.8	5.8	38.0
n-Decane	0.8	ND	14.9	ND - 3.4	2.6	3.5	50.0
p-Dichlorobenzene	2.8	ND	1689.8	ND - 12.6	87.5	277.8	60.0
Limonene	4.9	ND	371.8	1.2 - 10.5	15.4	52.7	88.0
n-Undecane	ND	ND	49.9	ND - 1.7	4.6	10.7	36.0
Total VOC	91.1	22.1	1770.9	43.0 - 164.7	184.3	292.6	100.0

表 11-2 指針値超過住宅件数

	指針値 (μg/m ³)	全国 (425軒)		北海道 (104軒)		福島 (65軒)		名古屋 (57軒)		大阪 (78軒)		岡山 (71軒)		北九州 (50軒)	
		超過	(%)	超過	(%)	超過	(%)	超過	(%)	超過	(%)	超過	(%)	超過	(%)
Formaldehyde	100	15	(3.5)	10	(9.6)	1	(1.5)	0	(0.0)	1	(1.3)	1	(1.4)	2	(4.0)
Acetaldehyde	48	52	(12.2)	24	(23.1)	8	(12.3)	6	(10.5)	5	(6.4)	5	(7.0)	4	(8.0)
Toluene	260	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)
Ethylbenzen	3800	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)
Styrene	220	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)
Xylene	870	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)
p-Dichlorobenzene	240	24	(5.6)	2	(1.9)	9	(13.8)	8	(14.0)	0	(0.0)	1	(1.4)	4	(8.0)
TVOC(暫定目標値)	400	34	(8.0)	4	(3.8)	12	(18.5)	7	(12.3)	2	(2.6)	3	(4.2)	6	(12.0)

表 12 化学物質濃度とシックハウス症状の関連

	SHS1症状あり(N=119)										SHS1症状なし(N=1360)										p
	Mean					SD					Mean					SD					
	Median	Min	Max	25% - 75%		Mean	SD	Mean	SD	Median	Min	Max	0.25 - 0.75	Mean	SD						
アルデヒド類																					
Formaldehyde	44.9	ND	202.8	31.6 - 65.7	51.3	34.6	39.7	ND	202.8	27.5 - 56.8	25.4	0.03	0.026 *								
Acetaldehyde	21.7	ND	129.5	14.4 - 33.0	26.9	21.3	22.3	ND	208.9	14.1 - 35.4	20.9	0.90	0.898								
Acetone	42.1	ND	606.0	26.8 - 60.7	56.3	73.2	34.5	ND	606.0	23.3 - 54.6	59.7	0.08	0.077								
Acrolein	ND	ND	ND	ND - ND	0.5	0.0	ND	ND	6.1	ND - ND	0.2	0.767									
Propionaldehyde	9.1	ND	36.7	5.5 - 13.7	10.1	6.7	7.7	ND	127.1	4.5 - 14.4	9.4	0.28	0.279								
Crotonaldehyde	6.4	ND	29.9	ND - 9.6	6.4	5.8	4.2	ND	112.5	ND - 9.2	7.8	0.04	0.043 *								
n-Butyraldehyde	3.2	ND	23.3	1.3 - 6.8	5.0	5.0	2.3	ND	109.5	1.0 - 6.3	8.8	0.05	0.053								
Benzaldehyde	4.9	ND	100.3	1.6 - 14.9	10.0	14.5	3.8	ND	117.1	1.1 - 10.4	13.1	0.10	0.103								
iso-Valeraldehyde	2.9	ND	89.8	ND - 13.4	8.4	12.9	2.8	ND	104.6	ND - 8.3	11.4	0.08	0.084								
Valeraldehyde	4.9	ND	223.7	1.5 - 10.5	9.3	21.6	3.8	ND	223.7	1.2 - 8.6	16.2	0.16	0.155								
Total m.o.p-Tolualdehyde	ND	ND	31.4	ND - 2.3	2.2	3.9	ND	ND	222.9	ND - 3.1	10.0	0.17	0.165								
Hexaldehyde	9.6	ND	108.0	5.6 - 19.9	15.3	16.4	9.8	ND	198.5	4.7 - 18.7	18.5	0.36	0.358								
2,5-Dimethylaldehyde	ND	ND	12.6	ND - ND	0.7	1.2	ND	ND	19.6	ND - ND	1.3	0.58	0.579								
Total aldehyde	183.0	7.0	798.6	115.3 - 252.5	202.7	130.3	161.5	7.0	798.6	96.9 - 240.0	116.9	0.11	0.107								
VOC類																					
2-Butanone(Ethyl Methyl Ketone)	ND	ND	37.4	ND - 1.2	1.6	3.8	ND	ND	37.4	ND - 1.6	2.6	0.28	0.275								
Ethyl acetate	ND	ND	313.2	ND - 4.9	11.2	40.5	ND	ND	313.2	ND - 6.4	31.6	0.35	0.346								
n-Hexane	ND	ND	178.1	ND - ND	3.1	17.3	ND	ND	178.1	ND - ND	7.6	0.98	0.979								
Chloroform	ND	ND	4.7	ND - ND	0.7	0.6	ND	ND	5.9	ND - ND	0.8	0.09	0.092								
2,4-Dimethylpentane	ND	ND	1.9	ND - ND	0.6	0.2	ND	ND	3.8	ND - ND	0.4	0.20	0.200								
1,2-Dichloroethane	ND	ND	9.8	ND - ND	1.0	1.8	ND	ND	6.5	ND - ND	0.4	0.00	0.000 **								
1,1,1-Trichloroethane	ND	ND	15.6	ND - ND	0.8	1.5	ND	ND	15.6	ND - ND	0.9	0.39	0.388								
n-Butanol	ND	ND	11.5	ND - ND	1.0	1.5	ND	ND	11.5	ND - ND	1.2	0.78	0.775								
Benzene	1.2	ND	13.8	ND - 2.5	2.1	2.3	1.1	ND	21.7	ND - 2.3	2.1	0.17	0.168								
Carbon tetrachloride	ND	ND	1.4	ND - ND	0.5	0.1	ND	ND	1.4	ND - ND	0.1	0.55	0.554								
1,2-Dichloropropane	ND	ND	2.8	ND - ND	0.5	0.2	ND	ND	2.8	ND - ND	0.1	0.11	0.107								
Trichloroethylene	ND	ND	ND	ND - ND	ND	0.0	ND	ND	3.8	ND - ND	0.3	0.15	0.153								
n-Heptane	ND	ND	13.1	ND - 3.7	2.3	3.0	ND	ND	129.6	ND - 2.6	7.3	0.95	0.952								
2-Pentanone(Methylisobutylketone)	ND	ND	7.9	ND - 1.5	1.3	1.4	ND	ND	32.0	ND - 1.1	2.3	0.04	0.041								
Toluene	13.5	ND	139.8	8.7 - 24.9	18.9	18.6	12.9	ND	144.2	8.2 - 20.3	15.6	0.20	0.195								
Chlorodibromomethane	ND	ND	1.9	ND - ND	0.6	0.2	ND	ND	6.0	ND - ND	0.3	0.00	0.000 **								
Butyl acetate	2.4	ND	61.4	ND - 5.9	6.2	11.1	2.6	ND	49.3	ND - 4.9	5.7	0.88	0.881								
n-Octane	ND	ND	18.3	ND - 3.3	3.2	4.5	ND	ND	45.5	ND - 2.6	5.4	0.16	0.156								
Tetrachloroethylene	ND	ND	26.1	ND - ND	1.1	3.4	ND	ND	167.0	ND - ND	8.0	0.99	0.985								
Ethylbenzene	3.3	ND	15.1	1.6 - 4.6	3.8	3.2	2.8	ND	24.8	1.6 - 4.5	2.9	0.49	0.494								
Total m.o.p-Xylene	5.6	ND	51.3	2.9 - 12.1	9.3	9.7	5.8	ND	101.1	3.0 - 10.8	8.7	0.35	0.347								
Styrene	ND	ND	52.7	ND - ND	1.0	4.8	ND	ND	52.7	ND - ND	1.5	0.24	0.242								
n-Nonane	1.8	ND	38.3	ND - 6.1	2.7	9.1	7.7	ND	160.0	ND - 4.6	9.5	0.03	0.025 *								
alpha-Pinene	6.6	ND	266.6	2.8 - 27.5	23.7	46.8	7.7	ND	1052.7	2.3 - 26.8	82.7	0.67	0.667								
Total Trimethylbenzene	2.9	ND	79.9	ND - 5.9	6.5	11.6	2.7	ND	103.0	ND - 5.3	7.3	0.57	0.568								
n-Decane	ND	ND	56.2	ND - 4.0	4.9	9.7	ND	ND	84.7	ND - 3.2	7.5	0.52	0.523								
p-Dichlorobenzene	1.3	ND	1689.8	ND - 10.2	44.9	186.5	1.8	ND	1689.8	ND - 15.1	145.6	0.44	0.437								
Limonene	9.4	ND	116.6	4.3 - 27.2	21.5	28.2	9.0	ND	601.6	3.8 - 19.1	48.6	0.25	0.251								
n-Undecane	ND	ND	101.3	ND - 2.2	5.9	15.9	ND	ND	101.3	ND - 2.3	11.2	0.96	0.961								
TVOC	112.6	27.1	1770.9	67.3 - 218.8	184.6	207.3	108.6	16.0	1770.9	68.3 - 201.6	198.6	0.32	0.322								

Mann-Whitney検定

厚生労働科学研究補助金（健康科学総合研究事業）
分担研究報告書

アルデヒド類・VOC類の空气中濃度とSHS2との関係(全国)

単位: $\mu\text{g}/\text{m}^3$ N=1479

	SHS2症状あり(N=267)					SHS2症状なし(N=1212)					P	
	Median	Min	Max	25% - 75%	Mean	SD	Median	Min	Max	0.25 - 0.75		Mean
アルデヒド類												
Formaldehyde	44.9	ND	202.8	32.7 - 63.1	50.9	32.3	39.6	ND	202.8	26.8 - 56.0	24.6	0.00 **
Acetaldehyde	23.8	ND	129.5	15.3 - 36.2	28.3	20.9	22.2	ND	208.9	14.0 - 33.9	21.0	0.229
Acetone	42.1	ND	606.0	28.2 - 60.7	56.4	70.6	33.4	ND	606.0	23.1 - 54.2	58.5	0.001 **
Acrolein	ND	ND	ND	ND - ND	ND	ND	ND	ND	6.1	ND - ND	0.2	0.639
Propionaldehyde	9.8	ND	36.7	5.5 - 15.2	10.5	6.8	7.5	ND	127.1	4.4 - 14.1	9.6	0.004 **
Crotonaldehyde	6.6	ND	29.9	ND - 10.5	6.5	5.5	3.6	ND	112.5	ND - 9.0	8.1	0.000 **
n-Butyraldehyde	3.5	ND	109.5	1.4 - 7.2	5.3	7.8	2.2	ND	109.5	ND - 6.0	8.6	0.000 **
Benzaldehyde	5.8	ND	100.3	1.6 - 13.6	10.3	13.3	3.6	ND	117.1	ND - 9.9	13.2	0.000 **
iso-Valeraldehyde	4.5	ND	89.8	ND - 11.8	8.4	11.6	2.5	ND	104.6	ND - 8.0	11.5	0.000 **
Valeraldehyde	5.0	ND	223.7	1.7 - 12.7	9.3	16.1	3.6	ND	223.7	1.1 - 8.6	16.8	0.000 **
Total m.o.p-Tolualdehyde	ND	ND	54.1	ND - 3.3	3.3	6.3	ND	ND	222.9	ND - 3.0	10.3	0.168
Hexaldehyde	10.7	ND	127.3	6.0 - 20.6	17.0	19.4	9.5	ND	198.5	4.6 - 18.1	18.1	0.008 *
2,5-Dimethylaldehyde	ND	ND	12.6	ND - ND	0.8	1.4	ND	ND	19.6	ND - ND	1.3	0.465
Total aldehyde	184.7	7.0	798.6	122.8 - 267.1	207.7	125.6	157.1	7.0	798.6	96.2 - 234.1	115.9	0.000 **
VOC類												
2-Butanone(Ethyl Methyl Ketone)	ND	ND	37.4	ND - ND	1.5	3.6	ND	ND	37.4	ND - 1.9	2.5	0.036 *
Ethyl acetate	ND	ND	313.2	ND - 6.3	12.4	40.2	ND	ND	313.2	ND - 6.3	30.4	0.804
n-Hexane	ND	ND	178.1	ND - ND	2.8	15.9	ND	ND	178.1	ND - ND	6.1	0.798
Chloroform	ND	ND	4.9	ND - ND	0.8	0.8	ND	ND	5.9	ND - ND	0.8	0.550
2,4-Dimethylpentane	ND	ND	2.0	ND - ND	0.6	0.3	ND	ND	3.8	ND - ND	0.4	0.171
1,2-Dichloroethane	ND	ND	9.8	ND - ND	0.8	1.2	ND	ND	6.5	ND - ND	0.4	0.001 **
1,1,1-Trichloroethane	ND	ND	15.6	ND - ND	0.7	1.4	ND	ND	15.6	ND - ND	0.8	0.690
n-Butanol	ND	ND	11.5	ND - 2.4	1.0	1.4	ND	ND	11.0	ND - ND	1.1	0.85
Benzene	1.1	ND	13.8	ND - 2.4	1.9	2.3	1.1	ND	21.7	ND - 2.3	2.1	0.656
Carbon tetrachloride	ND	ND	1.4	ND - ND	0.5	0.1	ND	ND	1.4	ND - ND	0.1	0.66
1,2-Dichloropropane	ND	ND	2.8	ND - ND	0.5	0.2	ND	ND	2.8	ND - ND	0.1	0.028 *
Trichloroethylene	ND	ND	ND	ND - ND	ND	0.0	ND	ND	3.8	ND - ND	0.3	0.023 *
n-Heptane	ND	ND	35.3	ND - 3.7	2.8	4.8	ND	ND	129.6	ND - 2.6	7.4	0.849
2-Pentanone(Methylisobutylketone)	ND	ND	32.0	ND - 1.3	1.3	2.3	ND	ND	32.0	ND - 1.1	2.2	0.091
Toluene	12.9	ND	139.8	8.1 - 21.5	17.1	16.6	12.9	ND	144.2	8.4 - 20.4	15.7	0.893
Chlorodibromomethane	ND	ND	6.0	ND - ND	0.6	0.4	ND	ND	6.0	ND - ND	0.3	0.000 **
Butyl acetate	2.5	ND	61.4	ND - 5.7	5.2	8.5	2.6	ND	49.3	ND - 4.9	5.7	0.912
n-Octane	ND	ND	34.3	ND - 3.2	3.1	4.9	ND	ND	45.5	ND - 2.6	5.5	0.165
Tetrachloroethylene	ND	ND	167.0	ND - ND	2.8	17.7	ND	ND	26.1	ND - ND	2.0	0.294
Ethylbenzene	3.0	ND	15.1	1.7 - 4.6	3.8	3.0	2.8	ND	24.8	1.6 - 4.5	2.9	0.119
Total m.o.p-Xylene	5.6	ND	51.3	3.1 - 11.7	8.9	9.0	5.9	ND	101.1	2.9 - 10.6	8.7	0.205
Styrene	ND	ND	52.7	ND - ND	0.7	3.2	ND	ND	52.7	ND - ND	1.6	0.209 *
n-Nonane	1.6	ND	57.6	ND - 6.7	5.5	9.3	ND	ND	160.0	ND - 4.4	9.5	0.009 *
alpha-Pinene	7.0	ND	302.5	2.6 - 29.5	27.8	49.8	7.6	ND	1052.7	2.2 - 26.5	85.7	0.420
Total Trimethylbenzene	2.9	ND	79.9	ND - 5.9	5.9	10.0	2.7	ND	103.0	ND - 5.2	7.2	0.450
n-Decane	ND	ND	56.2	ND - 3.3	4.7	9.8	ND	ND	84.7	ND - 3.2	7.1	0.228
p-Dichlorobenzene	1.2	ND	1689.8	ND - 7.8	36.4	142.3	2.0	ND	1689.8	ND - 17.2	150.7	0.010 *
Limonene	9.2	ND	601.6	4.4 - 23.9	26.0	65.4	9.0	ND	601.6	3.7 - 18.9	42.2	0.327
n-Undecane	ND	ND	101.3	ND - 1.8	5.8	16.1	ND	ND	101.3	ND - 2.4	10.4	0.236
TVOC	120.9	22.1	1770.9	67.4 - 211.9	182.8	189.0	108.2	16.0	1770.9	68.3 - 197.3	201.5	0.101

Mann-Whitney検定

厚生労働科学研究補助金（健康科学総合研究事業）
分担研究報告書

アルデヒド類・VOC類の気中濃度とSHS1との関係(北海道)

単位: $\mu\text{g}/\text{m}^3$ N=343人

	SHS1症状あり(N=34)					SHS1症状なし(N=309)					Mean	SD	p
	Median	Min	Max	25%	75%	Median	Min	Max	25%	75%			
アルデヒド類													
Formaldehyde	71.0	42.5	202.8	58.9	92.6	64.0	22.1	202.8	47.9	76.1	64.4	27.2	0.001**
Acetaldehyde	33.4	4.6	129.5	24.6	46.0	33.9	1.7	129.5	24.2	48.7	38.9	23.3	0.995
Acetone	51.1	21.7	606.0	33.3	80.8	42.3	IND	606.0	30.8	60.3	54.8	61.8	0.020*
Acrolein	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0	1.000
Propionaldehyde	11.7	5.1	22.3	7.5	13.7	9.9	2.4	24.8	6.7	14.8	10.7	5.0	0.349
Crotonaldehyde	9.4	2.1	20.6	6.4	11.9	7.9	ND	20.6	5.4	10.6	8.1	3.6	0.024*
n-Butyraldehyde	4.8	1.0	9.4	2.6	8.5	4.1	ND	16.6	2.5	6.7	4.8	3.2	0.277
Benzaldehyde	7.5	1.6	18.5	4.3	13.7	5.8	1.6	117.1	3.7	9.9	8.6	13.2	0.199
iso-Valeraldehyde	6.6	1.4	16.6	3.8	11.8	4.7	1.4	104.6	3.2	8.6	7.4	11.8	0.148
Valeraldehyde	6.5	ND	223.7	5.4	13.2	7.5	ND	223.7	4.7	11.5	11.1	22.2	0.734
Total m,o,p-Tolualdehyde	2.1	ND	13.0	ND	3.6	2.3	ND	21.5	ND	4.0	3.2	3.5	0.863
Hexaldehyde	19.7	6.2	47.5	11.4	35.1	17.2	2.0	198.5	10.4	29.6	25.3	28.2	0.373
2,5-Dimethylaldehyde	ND	ND	3.0	ND	0.6	ND	ND	6.9	ND	ND	0.7	0.8	0.068
Total aldehyde	236.3	130.2	798.6	184.4	321.9	208.8	65.4	798.6	162.2	277.4	238.6	111.8	0.062
VOC類													
2-Butanone(Ethyl Methyl Ketone)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0	1.000
Ethyl acetate	ND	ND	31.5	ND	ND	ND	ND	87.7	ND	3.1	3.6	8.8	0.270
n-Hexane	ND	ND	8.1	ND	ND	ND	ND	31.0	ND	ND	1.3	3.5	0.881
Chloroform	ND	ND	4.7	ND	ND	ND	ND	5.0	ND	ND	0.8	0.9	0.486
2,4-Dimethylpentane	ND	ND	ND	ND	ND	ND	ND	3.8	ND	ND	0.6	0.5	0.138
1,2-Dichloroethane	ND	ND	9.8	ND	ND	ND	ND	4.0	ND	ND	0.6	0.5	0.079
1,1,1-Trichloroethane	ND	ND	15.6	ND	ND	ND	ND	15.6	ND	ND	1.0	1.7	0.455
n-Butanol	ND	ND	11.5	ND	ND	ND	ND	11.5	ND	ND	0.9	1.2	0.358
Benzene	1.1	ND	8.5	ND	3.2	1.1	ND	9.2	ND	2.4	1.8	1.9	0.165
Carbon tetrachloride	ND	ND	1.0	ND	ND	ND	ND	1.0	ND	ND	0.5	0.0	0.310
1,2-Dichloropropane	ND	ND	2.8	ND	ND	ND	ND	2.8	ND	ND	0.5	0.2	0.173
Trichloroethylene	ND	ND	ND	ND	ND	ND	ND	1.4	ND	ND	0.5	0.1	0.456
n-Heptane	3.7	ND	13.1	1.6	7.8	2.3	ND	35.3	ND	6.2	4.6	6.8	0.110
2-Pentanone(Methyl isobutyl ketone)	1.5	ND	5.7	ND	3.0	ND	ND	32.0	ND	1.5	1.7	3.7	0.008**
Toluene	26.1	ND	139.8	14.1	38.3	16.3	ND	144.2	12.2	30.9	25.4	24.3	0.159
Chlorodibromomethane	ND	ND	1.9	ND	0.7	ND	ND	1.9	ND	ND	0.5	0.2	0.000**
Butyl acetate	5.7	ND	61.4	3.7	13.8	4.9	ND	49.3	2.9	9.3	8.4	9.0	0.190
n-Octane	5.0	ND	18.3	1.5	10.7	3.4	ND	41.2	1.6	7.9	5.7	6.5	0.246
Tetrachloroethylene	ND	ND	26.1	ND	ND	ND	ND	167.0	ND	ND	3.0	16.6	0.698
Ethylbenzene	4.5	2.0	15.1	3.4	7.1	4.6	1.1	21.8	3.1	6.7	5.1	2.8	0.448
Total m,o,p-Xylene	12.5	4.8	39.3	10.3	18.4	11.4	3.1	49.6	8.2	15.3	12.5	6.5	0.093
Styrene	ND	ND	1.3	ND	ND	ND	ND	4.0	ND	ND	0.7	0.6	0.424
n-Nonane	5.0	ND	34.6	2.8	11.0	4.4	ND	34.6	2.0	8.9	6.2	6.0	0.193
alpha-Pinene	12.9	1.7	266.6	6.2	45.2	7.8	ND	302.5	3.6	22.9	27.5	55.2	0.025**
Total Trimethylbenzene	4.5	ND	28.7	2.4	8.3	4.5	ND	28.7	2.9	8.3	5.8	4.9	0.959
n-Decane	ND	ND	56.2	ND	5.7	ND	ND	56.2	ND	4.2	3.5	7.1	0.699
p-Dichlorobenzene	ND	ND	18.6	ND	1.7	ND	ND	266.3	ND	4.3	12.7	38.7	0.198
Limonene	20.2	3.5	74.8	12.2	33.4	13.0	ND	484.9	7.7	20.4	26.6	59.2	0.004**
n-Undecane	ND	ND	89.5	ND	ND	ND	ND	89.5	ND	ND	2.3	9.3	0.607
TVOC	180.3	60.9	401.5	111.6	218.8	140.5	35.5	775.7	95.0	187.6	165.2	110.7	0.052

Mann-Whitney検定

厚生労働科学研究補助金(健康科学総合研究事業)
分担研究報告書

アルデヒド類-VOC類の気中濃度とSHS2との関係(北海道)

単位: $\mu\text{g}/\text{m}^3$

N=343人

	SHS2症状あり(N=82)					SHS2症状なし(N=261)					
	Median	Min	Max	25% - 75%	(参考値) Mean SD	Median	Min	Max	25% - 75%	(参考値) Mean SD	P
アルデヒド類											
Formaldehyde	69.8	22.1	202.8	52.2 - 85.9	78.1 39.2	63.2	22.1	202.8	46.8 - 75.7	62.7 24.9	0.001**
Acetaldehyde	35.9	4.6	129.5	24.7 - 58.3	43.5 25.6	33.4	1.7	129.5	22.3 - 47.9	37.7 23.1	0.049**
Acetone	51.1	20.2	606.0	34.2 - 80.3	73.8 92.0	38.5	1ND	606.0	28.8 - 58.6	52.2 56.8	0.000**
Acrolein	ND	ND	ND	ND - ND	ND 0.0	ND	ND	ND	ND - ND	ND 0.0	1.000
Propionaldehyde	11.7	3.8	22.3	7.1 - 15.5	11.9 5.1	9.5	2.4	24.8	6.5 - 14.2	10.4 4.9	0.024*
Crotonaldehyde	9.6	ND	20.6	6.4 - 11.8	9.7 4.0	7.5	ND	20.6	4.9 - 10.3	7.8 3.5	0.000**
n-Butyraldehyde	4.8	ND	12.8	3.1 - 7.8	5.3 2.7	3.6	ND	16.6	2.3 - 6.6	4.7 3.2	0.021*
Benzaldehyde	7.5	1.6	18.5	5.1 - 12.4	8.6 4.8	5.5	1.6	117.1	3.6 - 9.2	8.7 14.2	0.011*
iso-Valeraldehyde	6.6	1.4	16.6	4.3 - 10.0	7.3 4.2	4.6	1.4	104.6	3.1 - 7.9	7.4 12.7	0.01*
Valeraldehyde	8.0	ND	23.7	5.5 - 13.3	13.0 24.8	7.3	ND	23.7	4.7 - 10.2	11.0 23.8	0.092
Total m.o.p-Tolualdehyde	2.3	ND	21.5	ND - 4.0	3.3 3.6	2.3	ND	21.5	ND - 4.0	3.1 3.4	0.769
Hexaldehyde	19.9	6.2	127.3	11.4 - 39.7	28.7 25.5	17.1	2.0	198.5	10.4 - 28.9	23.8 27.5	0.017*
2,5-Dimethylaldehyde	ND	ND	3.0	ND - ND	0.7 0.5	ND	ND	6.9	ND - ND	0.7 0.8	0.313
Total aldehyde	230.9	107.7	798.6	184.9 - 337.6	284.6 142.6	207.4	65.4	798.6	155.8 - 270.7	231.0 105.8	0.002**
VOC類											
2-Butanone(Ethyl Methyl Ketone)	ND	ND	ND	ND - ND	ND 0.0	ND	ND	ND	ND - ND	ND 0.0	1.000
Ethyl acetate	ND	ND	87.7	ND - 4.4	5.4 12.2	ND	ND	87.7	ND - ND	ND 3.0	0.371
n-Hexane	ND	ND	8.1	ND - ND	1.2 2.0	ND	ND	31.0	ND - ND	1.3 3.7	0.338
Chloroform	ND	ND	4.7	ND - ND	0.7 0.7	ND	ND	5.0	ND - ND	0.9 1.0	0.933
2,4-Dimethylpentane	ND	ND	1.9	ND - ND	0.5 0.2	ND	ND	3.8	ND - ND	0.6 0.5	0.157
1,2-Dichloroethane	ND	ND	9.8	ND - ND	0.9 1.8	ND	ND	4.0	ND - ND	0.6 0.5	0.652
1,1,1-Trichloroethane	ND	ND	15.6	ND - ND	1.1 2.4	ND	ND	15.6	ND - ND	1.0 1.6	0.914
n-Butanol	ND	ND	11.5	ND - ND	1.1 1.9	ND	ND	8.1	ND - ND	0.8 1.0	0.125
Benzene	1.1	ND	8.5	ND - 2.8	2.2 2.3	1.1	ND	9.2	ND - 2.4	1.7 1.8	0.145
Carbon tetrachloride	ND	ND	1.0	ND - ND	0.5 0.1	ND	ND	1.0	ND - ND	0.5 0.1	0.970
1,2-Dichloropropane	ND	ND	2.8	ND - ND	0.6 0.4	ND	ND	2.8	ND - ND	0.5 0.1	0.085
Trichloroethylene	ND	ND	ND	ND - ND	0.0 0.0	ND	ND	1.4	ND - ND	0.5 0.1	0.204
n-Heptane	2.5	ND	35.3	ND - 6.6	4.7 6.0	2.3	ND	35.3	ND - 6.2	4.6 6.7	0.187
2-Pentanone(Methylisobutylketone)	1.1	ND	32.0	ND - 2.0	2.0 3.7	ND	ND	32.0	ND - 1.5	1.6 3.5	0.040*
Toluene	18.8	ND	139.8	8.6 - 30.2	24.6 25.0	16.7	ND	144.2	12.8 - 33.0	26.3 24.6	0.556
Chlorobromomethane	ND	ND	1.9	ND - ND	0.6 0.3	ND	ND	1.9	ND - ND	0.5 0.2	0.002**
Butyl acetate	5.7	ND	61.4	3.5 - 12.8	9.9 11.4	4.9	ND	49.3	2.8 - 8.9	8.4 9.2	0.242
n-Octane	3.3	ND	19.9	1.5 - 9.9	5.7 5.4	3.6	ND	41.2	1.6 - 7.8	5.7 6.6	0.752
Tetrachloroethylene	ND	ND	167.0	ND - ND	7.6 31.3	ND	ND	26.1	ND - ND	1.4 3.7	0.817
Ethylbenzene	4.5	1.1	15.1	3.4 - 7.1	5.4 3.0	4.6	1.1	21.8	3.1 - 6.7	5.1 2.8	0.515
Total m.o.p-Xylene	11.7	3.3	39.3	8.6 - 16.9	13.6 7.6	11.5	3.1	49.6	8.2 - 15.5	12.5 6.3	0.318
Styrene	ND	ND	2.6	ND - ND	0.6 0.4	ND	ND	4.0	ND - ND	0.7 0.6	0.835
n-Nonane	5.2	ND	34.6	2.8 - 8.9	8.0 8.6	4.4	ND	32.4	1.9 - 8.9	5.9 5.3	0.165
alpha-Pinene	12.3	ND	302.5	5.0 - 46.8	40.9 68.6	6.9	ND	302.5	3.5 - 19.2	25.3 52.2	0.005*
Total Trimethylbenzene	4.3	ND	28.7	2.4 - 7.8	6.8 7.4	4.6	ND	24.8	2.9 - 8.5	5.6 4.2	0.828
n-Decane	ND	ND	56.2	ND - 4.7	6.0 13.0	ND	ND	23.5	ND - 4.1	3.0 4.6	0.584
p-Dichlorobenzene	ND	ND	254.8	ND - 1.8	9.4 40.0	ND	ND	286.3	ND - 4.4	12.4 35.8	0.105
Limonene	16.5	3.2	484.9	10.2 - 30.6	38.4 88.5	12.8	ND	267.6	7.4 - 18.7	22.7 40.9	0.003**
n-Undecane	ND	ND	89.5	ND - ND	5.3 19.2	ND	ND	34.2	ND - ND	1.5 3.7	0.934
TVOC	179.5	45.2	775.7	106.3 - 219.7	205.2 148.9	131.4	35.5	547.6	95.0 - 181.6	155.2 89.7	0.003**

Mann-Whitney検定

厚生労働科学研究補助金（健康科学総合研究事業）
分担研究報告書

アルデヒド類・VOC類の気中濃度とSHS1との関係(福島)

単位: $\mu\text{g}/\text{m}^3$

N=238人

	SHS1症状あり(N=17)					SHS1症状なし(N=221)					Mean	SD	p
	Median	Min	Max	25%	75%	Median	Min	Max	25%	75%			
アルデヒド類													
Formaldehyde	39.7	27.5	57.2	32.3	51.1	35.9	12.8	107.3	27.5	49.4	40.0	15.8	0.384
Acetaldehyde	25.6	16.0	62.6	21.5	33.3	25.8	10.2	173.8	19.5	37.6	30.6	19.5	0.805
Acetone	46.6	22.9	424.0	34.4	68.0	44.9	17.6	424.0	31.6	64.4	63.6	66.9	0.520
Acrolein	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.000
Propionaldehyde	6.8	1.5	20.8	3.9	10.2	5.4	ND	20.8	3.3	8.5	6.4	4.3	0.218
Crotonaldehyde	4.2	ND	16.4	ND	8.2	ND	ND	112.5	ND	5.1	5.0	15.0	0.306
n-Butyraldehyde	1.9	ND	18.3	1.3	6.5	1.9	ND	57.7	1.3	4.8	4.3	8.0	0.626
Benzaldehyde	2.5	ND	40.2	0.8	9.3	2.5	ND	40.2	ND	8.3	4.6	5.4	0.841
iso-Valeraldehyde	1.5	ND	36.3	ND	8.3	ND	ND	36.3	ND	5.8	3.3	4.8	0.569
Valeraldehyde	3.5	ND	27.4	2.1	6.0	3.3	ND	27.4	1.6	6.2	5.3	5.9	0.601
Total m.o.p-Toluialdehyde	ND	ND	7.9	ND	ND	ND	ND	54.1	ND	4.5	4.7	10.1	0.251
Hexaldehyde	1ND	5.1	24.7	6.9	16.5	9.2	ND	63.9	4.8	16.5	13.7	13.2	0.452
2,5-Dimethylaldehyde	ND	ND	ND	ND	ND	ND	ND	2.3	ND	ND	0.5	0.3	0.492
Total aldehyde	160.3	92.7	514.5	119.4	226.0	155.8	51.9	514.5	110.7	211.4	182.9	107.6	0.476
VOC類													
2-Butanone(Ethyl Methyl Ketone)	ND	ND	37.4	ND	4.4	ND	ND	37.4	ND	4.9	3.2	4.8	0.631
Ethyl acetate	4.0	ND	313.2	ND	90.4	6.3	ND	313.2	ND	21.2	36.2	68.6	0.803
n-Hexane	ND	ND	178.1	ND	1.9	ND	ND	178.1	ND	2.0	3.5	17.0	0.719
Chloroform	ND	ND	2.1	ND	1.1	ND	ND	3.3	ND	1.5	1.0	0.8	0.290
2,4-Dimethylpentane	ND	ND	1.9	ND	ND	ND	ND	2.0	ND	ND	0.7	0.5	0.840
1,2-Dichloroethane	ND	ND	2.0	ND	ND	ND	ND	2.8	ND	ND	0.6	0.3	0.473
1,1,1-Trichloroethane	ND	ND	1.8	ND	ND	ND	ND	1.8	ND	ND	0.6	0.2	0.971
n-Butanol	ND	ND	3.4	ND	2.1	ND	ND	8.4	ND	1.3	1.2	1.4	0.806
Benzene	ND	ND	5.8	ND	1.9	1.1	ND	7.4	ND	2.8	1.8	1.6	0.643
Carbon tetrachloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0	1.000
1,2-Dichloropropane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0	1.000
Trichloroethylene	ND	ND	ND	ND	ND	ND	ND	3.8	ND	ND	0.6	0.5	0.426
n-Heptane	ND	ND	7.6	ND	5.9	ND	ND	39.9	ND	4.5	3.9	7.1	0.482
2-Pentanone(Methylisobutylketone)	ND	ND	1.1	ND	ND	ND	ND	5.3	ND	ND	0.8	0.9	0.193
Toluene	17.9	ND	51.5	4.7	20.9	15.6	ND	87.4	8.0	23.1	16.9	12.4	0.591
Chlorodibromomethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.5	0.0	1.000
Butyl acetate	ND	ND	7.6	ND	3.3	1.9	ND	12.9	ND	3.9	2.6	2.5	0.221
n-Octane	ND	ND	12.6	ND	11.3	ND	ND	37.7	ND	3.7	4.4	8.0	0.755
Tetrachloroethylene	ND	ND	7.2	ND	ND	ND	ND	21.4	ND	ND	0.8	2.2	0.790
Ethylbenzene	1.8	ND	9.1	ND	5.3	2.9	ND	15.7	1.5	4.5	3.6	3.4	0.347
Total m.o.p-Xylene	2.0	ND	51.3	ND	15.1	6.3	ND	73.5	2.2	12.3	9.4	12.4	0.300
Styrene	ND	ND	ND	ND	ND	ND	ND	2.2	ND	ND	0.5	0.2	0.426
n-Nonane	2.2	ND	38.3	ND	14.2	2.1	ND	57.6	ND	8.8	7.8	12.3	0.792
alpha-Pitene	6.5	ND	61.4	ND	29.8	9.5	ND	649.1	ND	42.0	44.5	96.1	0.296
Total Trimethylbenzene	ND	ND	66.9	ND	12.9	3.0	ND	66.9	2.0	6.8	6.2	8.8	0.267
n-Decane	ND	ND	30.0	ND	IND5	ND	ND	43.4	ND	ND	3.7	9.1	0.299
p-Dichlorobenzene	1.1	ND	477.2	ND	5.9	3.2	ND	1337.8	ND	31.3	75.3	191.6	0.158
Limonene	4.2	ND	68.3	0.9	9.6	7.3	ND	101.6	1.7	19.9	15.3	22.9	0.313
n-Undecane	ND	ND	77.3	ND	22.7	ND	ND	82.6	ND	8.3	9.3	17.7	0.966
TVOC	201.7	27.1	732.4	66.0	270.8	195.8	16.0	1393.9	96.5	313.2	256.3	246.9	0.480

Mann-Whitney検定

厚生労働科学研究補助金（健康科学総合研究事業）
分担研究報告書

アルヒド類・VOC類の気中濃度とSHS2との関係(福島)

単位: $\mu\text{g}/\text{m}^3$ N=238人

	SHS2症状あり(N=41)					SHS2症状なし(N=197)							
	Median	Min	Max	25% - 75%	Mean	SD	Median	Min	Max	25% - 75%	Mean	SD	P
アルヒド類													
Formaldehyde	39.7	27.5	64.4	33.1 - 51.1	41.3	10.4	35.9	12.8	107.3	27.1 - 49.4	39.8	16.3	0.169
Acetaldehyde	25.6	11.0	62.6	2ND - 35.7	28.5	10.8	26.4	10.2	173.8	19.5 - 37.6	30.9	20.4	0.984
Acetone	46.6	17.6	424.0	34.4 - 68.1	72.9	87.1	44.9	17.6	424.0	30.4 - 64.4	62.3	64.5	0.305
Acrolein	ND	ND	ND	ND - ND	ND	0.0	ND	ND	ND	ND - ND	ND	0.0	1.000
Propionaldehyde	5.5	ND	20.8	2.1 - 9.0	6.5	5.0	5.5	ND	20.8	3.4 - 8.6	6.5	4.3	0.675
Crotonaldehyde	ND	ND	16.4	ND - 5.6	3.5	4.3	ND	ND	112.5	ND - 5.2	5.3	15.8	0.874
n-Butyraldehyde	1.9	ND	18.3	1.4 - 5.1	3.9	4.5	1.9	ND	57.7	1.3 - 4.8	4.3	8.4	0.742
Benzaldehyde	2.5	ND	40.2	0.8 - 8.2	5.8	8.9	2.5	ND	40.2	ND - 8.5	4.5	4.9	0.759
iso-Valeraldehyde	ND	ND	36.3	ND - 6.9	4.5	8.1	ND	ND	36.3	ND - 5.8	3.2	4.3	0.792
Valeraldehyde	3.3	ND	27.4	2.3 - 6.2	6.5	7.9	3.3	ND	27.4	1.6 - 6.2	5.1	5.5	0.471
Total m.o.p-Tolualdehyde	ND	ND	54.1	ND - 4.5	4.6	11.7	ND	ND	54.1	ND - 3.2	4.5	9.4	0.781
Hexaldehyde	1ND	2.6	30.3	7.7 - 16.2	12.5	7.1	8.9	ND	63.9	4.7 - 16.8	13.8	13.8	0.221
2,5-Dimethylaldehyde	ND	ND	ND	ND - ND	0.5	0.0	ND	ND	2.3	ND - ND	0.5	0.3	0.259
Total aldehyde	155.8	66.7	514.5	122.8 - 224.9	191.8	107.3	156.5	51.9	514.5	104.9 - 211.4	181.7	107.0	0.545
VOC類													
2-Butanone(Ethyl Methyl Ketone)	1.3	ND	37.4	ND - 6.3	4.5	8.1	ND	ND	37.4	ND - 4.4	3.1	4.4	0.417
Ethyl acetate	4.0	ND	133.2	1.5 - 67.1	51.2	89.0	5.8	ND	133.2	ND - 21.2	34.6	66.4	0.737
n-Hexane	ND	ND	178.1	ND - 2.6	10.3	38.6	ND	ND	178.1	ND - 2.0	2.8	12.9	0.710
Chloroform	ND	ND	2.6	ND - 1.4	0.8	0.6	ND	ND	3.3	ND - 1.6	1.0	0.8	0.190
2,4-Dimethylpentane	ND	ND	2.0	ND - ND	0.7	0.5	ND	ND	2.0	ND - ND	0.7	0.5	0.679
1,2-Dichloroethane	ND	ND	2.8	ND - ND	0.6	0.4	ND	ND	2.8	ND - ND	0.6	0.3	0.423
1,1,1-Trichloroethane	ND	ND	1.8	ND - ND	0.5	0.2	ND	ND	1.8	ND - ND	0.6	0.2	0.316
n-Butanol	ND	ND	4.0	ND - 1.5	1.1	1.1	ND	ND	8.4	ND - 1.3	1.2	1.5	0.942
Benzene	1.4	ND	5.8	ND - 2.0	1.7	1.4	1.1	ND	7.4	ND - 2.8	1.8	1.7	0.567
Carbon tetrachloride	ND	ND	ND	ND - ND	ND	0.0	ND	ND	ND	ND - ND	ND	0.0	1.000
1,2-Dichloropropane	ND	ND	ND	ND - ND	ND	0.0	ND	ND	ND	ND - ND	ND	0.0	1.000
Trichloroethylene	ND	ND	ND	ND - ND	ND	0.0	ND	ND	3.8	ND - ND	0.6	0.5	0.190
n-Heptane	ND	ND	26.8	ND - 6.1	3.8	5.9	ND	ND	39.9	ND - 3.7	3.8	7.1	0.878
2-Pentanone(Methylisobutylketone)	ND	ND	3.3	ND - ND	0.7	0.7	ND	ND	5.3	ND - ND	0.8	1.0	0.939
Toluene	17.2	ND	51.5	6.5 - 22.1	15.9	10.6	15.6	ND	87.4	8.2 - 23.1	17.1	12.8	0.694
Chlorodibromomethane	ND	ND	ND	ND - ND	ND	0.0	ND	ND	ND	ND - ND	0.5	0.0	1.000
Butyl acetate	ND	ND	8.5	ND - 3.4	2.0	2.2	2.2	ND	12.9	ND - 3.9	2.6	2.5	0.117
n-Octane	ND	ND	34.3	ND - 8.5	4.4	6.7	ND	ND	37.7	ND - 3.5	4.4	8.1	0.855
Tetrachloroethylene	ND	ND	7.2	ND - ND	1.0	1.8	ND	ND	21.4	ND - ND	0.8	2.2	0.087
Ethylbenzene	2.4	ND	13.4	1.3 - 5.5	3.9	3.5	2.9	ND	15.7	1.2 - 4.4	3.5	3.3	0.678
Total m.o.p-Xylene	3.5	ND	51.3	1.7 - 17.6	10.2	12.7	6.6	ND	73.5	2.0 - 11.2	9.2	12.4	0.937
Styrene	ND	ND	ND	ND - ND	0.5	0.0	ND	ND	2.2	ND - ND	0.6	0.3	0.190
n-Nonane	2.2	ND	57.6	ND - 12.0	9.9	14.6	2.1	ND	57.6	ND - 8.6	7.5	11.8	0.838
alpha-Pinene	6.7	ND	186.1	ND - 32.7	27.8	42.9	9.5	ND	649.1	ND - 41.6	45.5	100.2	0.752
Total Trimethylbenzene	3.4	ND	66.9	ND - 11.2	9.4	15.1	2.8	ND	66.9	2.0 - 6.3	5.7	7.8	0.551
n-Decane	ND	ND	40.5	ND - 9.1	6.7	11.3	ND	ND	43.4	ND - ND	3.3	8.7	0.044*
p-Dichlorobenzene	2.0	ND	676.8	ND - 21.0	59.8	158.6	3.2	ND	1337.8	ND - 31.3	74.8	193.0	0.735
Limonene	5.5	ND	101.6	1.4 - 10.1	13.2	22.1	7.3	ND	101.6	1.7 - 20.0	15.5	22.9	0.303
n-Undecane	1.2	ND	77.3	ND - 22.7	13.5	22.0	ND	ND	82.6	ND - 6.8	8.7	16.9	0.578
TVOC	201.7	27.1	1095.5	108.7 - 316.2	256.8	224.6	188.8	16.0	1393.9	96.5 - 292.8	252.4	247.6	0.605

Mann-Whitney検定

厚生労働科学研究補助金(健康科学総合研究事業)
分担研究報告書

アルデヒド類・VOC類の気中濃度とSHS1との関係(名古屋)

単位: $\mu\text{g}/\text{m}^3$ N=191人

	SHS1症状あり(N=18)						SHS1症状なし(N=173)								
	Median	Min	Max	25%	75%	SD	Median	Min	Max	25%	75%	Mean	SD	P	
アルデヒド類															
Formaldehyde	36.4	15.8	55.1	29.6	5ND5	38.6	11.2	33.4	15.8	76.1	26.6	45.5	36.5	13.2	0.335
Acetaldehyde	20.0	10.4	80.0	16.3	21.3	23.9	17.7	16.2	6.7	80.0	12.0	29.6	23.3	16.6	0.387
Acetone	20.2	12.6	60.3	17.7	30.1	24.9	12.2	22.7	8.0	113.0	15.5	32.9	30.4	23.4	0.785
Acrolein	ND	ND	ND	ND	ND	ND	0.0	ND	ND	ND	ND	ND	ND	0.0	1.000
Propionaldehyde	5.5	2.2	36.7	3.3	7.0	7.3	7.8	4.7	1.4	36.7	3.5	7.5	6.6	5.7	0.929
Crotonaldehyde	ND	ND	8.4	ND	ND	0.9	1.9	ND	8.4	ND	ND	ND	0.7	1.2	0.413
n-Butyraldehyde	1.3	ND	6.5	ND	1.4	1.4	1.4	1.1	ND	6.5	ND	1.9	1.6	1.6	0.939
Benzaldehyde	0.9	ND	2.7	ND	1.8	1.2	0.8	1.1	ND	44.6	ND	2.4	2.6	6.6	0.351
iso-Valeraldehyde	ND	ND	ND	ND	ND	ND	0.0	ND	ND	3.4	ND	ND	0.6	0.4	0.574
Valeraldehyde	1.6	ND	7.9	ND	2.8	1.9	1.8	1.4	ND	11.2	ND	2.8	2.0	2.3	0.600
Total m.o.p-Tolualdehyde	ND	ND	3.4	ND	0.9	1.0	1.0	ND	9.9	ND	ND	ND	1.3	1.9	0.758
Hexaldehyde	9.6	2.7	34.9	3.8	11.1	9.4	7.3	5.6	ND	42.5	3.7	12.4	9.1	8.9	0.586
2,5-Dimethylaldehyde	ND	ND	ND	ND	ND	ND	0.0	ND	1.5	ND	ND	ND	0.5	0.1	0.647
Total aldehyde	96.9	67.7	268.3	93.5	117.2	112.5	49.6	97.6	43.6	283.6	74.2	122.9	116.1	62.3	0.697
VOC類															
2-Butanone(Ethyl Methyl Ketone)	2.2	ND	10.0	1.7	3.8	3.1	2.5	2.2	ND	10.0	1.4	3.5	2.6	1.7	0.553
Ethyl acetate	5.8	1.8	35.5	3.0	12.2	8.5	7.9	6.4	ND	36.8	3.6	12.0	8.7	7.2	0.788
n-Hexane	ND	ND	6.2	ND	2.6	1.6	1.7	7.8	ND	7.8	ND	0.9	1.2	1.4	0.161
Chloroform	ND	ND	ND	ND	ND	ND	0.0	ND	3.0	ND	ND	ND	0.6	0.3	0.386
2,4-Dimethylpentane	ND	ND	ND	ND	ND	ND	0.0	ND	ND	ND	ND	ND	ND	0.0	1.000
1,2-Dichloroethane	ND	ND	ND	ND	ND	ND	0.0	ND	ND	ND	ND	ND	ND	0.0	1.000
1,1,1-Trichloroethane	ND	ND	4.4	ND	ND	0.7	0.9	ND	4.4	ND	ND	ND	0.6	0.4	0.524
n-Butanol	ND	ND	4.6	ND	1.4	1.1	1.1	ND	9.5	ND	1.6	1.6	1.4	1.6	0.750
Benzene	ND	ND	1.8	ND	0.6	0.7	0.4	ND	3.0	ND	1.1	1.1	0.9	0.7	0.417
Carbon tetrachloride	ND	ND	ND	ND	ND	ND	0.0	ND	ND	ND	ND	ND	ND	0.0	1.000
1,2-Dichloropropane	ND	ND	ND	ND	ND	ND	0.0	ND	ND	ND	ND	ND	ND	0.0	1.000
Trichloroethylene	ND	ND	9.7	ND	0.7	1.3	2.2	ND	ND	ND	ND	ND	ND	0.0	1.000
n-Heptane	ND	ND	2.6	ND	1.2	0.8	0.5	ND	5.4	ND	1.3	1.3	2.0	4.1	0.821
2-Pentanone(Methylisobutylketone)	ND	ND	2.6	ND	1.2	0.8	0.5	ND	5.4	ND	1.3	1.3	1.1	1.2	0.469
Toluene	13.4	5.4	36.0	10.5	23.8	16.8	8.3	13.5	3.3	39.2	9.8	22.7	16.6	9.0	0.651
Chlorodibromomethane	ND	ND	ND	ND	ND	ND	0.0	ND	ND	ND	ND	ND	0.5	0.0	1.000
Butyl acetate	1.4	ND	4.3	ND	2.6	1.8	1.3	1.9	ND	9.5	ND	2.7	2.4	2.2	0.444
n-Octane	ND	ND	17.5	ND	1.2	2.7	5.4	ND	17.5	ND	ND	ND	1.3	2.3	0.143
Tetrachloroethylene	ND	ND	2.0	ND	ND	0.6	0.4	ND	2.2	ND	ND	ND	0.6	0.3	0.675
Ethylbenzene	3.4	1.0	12.4	1.7	4.3	4.1	3.6	2.6	ND	12.4	1.8	4.4	3.5	2.4	0.728
Total m.o.p-Xylene	5.2	2.0	38.7	2.9	12.9	9.6	11.5	4.9	ND	38.7	2.8	10.2	7.4	6.7	0.833
Styrene	ND	ND	ND	ND	ND	ND	0.0	ND	ND	ND	ND	ND	ND	0.0	1.000
n-Nonane	ND	ND	35.2	ND	4.2	5.5	11.1	ND	35.2	ND	ND	1.3	2.5	5.0	0.288
alpha-Pinene	7.2	ND	116.2	3.7	34.5	20.8	27.7	9.1	ND	1052.7	2.6	34.1	48.8	158.8	0.946
Total Trimethylbenzene	3.3	ND	32.6	1.6	10.0	8.6	11.7	3.0	ND	32.6	2.1	5.7	5.3	6.9	0.703
n-Decane	2.6	ND	28.2	1.6	10.0	6.9	9.3	2.9	ND	28.2	2.1	6.0	5.5	5.8	0.347
p-Dichlorobenzene	10.0	ND	429.1	1.5	83.6	85.7	152.2	7.8	ND	1407.5	1.3	44.4	95.8	219.0	0.793
Limonene	9.2	1.7	108.6	4.3	41.2	28.6	35.1	9.5	1.2	108.6	5.0	26.8	20.8	25.2	0.641
n-Undecane	1.5	ND	37.1	0.9	8.3	8.3	13.4	1.7	ND	44.3	1.2	8.6	7.3	11.3	0.686
TVOC	116.2	71.4	470.1	76.6	372.3	222.2	157.2	145.0	46.5	1527.1	70.5	312.0	240.4	287.8	0.278

Mann-Whitney検定

厚生労働科学研究補助金(健康科学総合研究事業)
分担研究報告書

アルデヒド類-VOC類の気中濃度とSHS2との関係(名古屋)

単位: $\mu\text{g}/\text{m}^3$ N=191人

	SHS2症状あり(N=34)					SHS2症状なし(N=157)							
	Median	Min	Max	25% - 75%	(参考値)	Median	Min	Max	25% - 75%	(参考値)			
アルデヒド類													
Formaldehyde	33.9	15.8	55.1	28.7 - 50.5	37.0	11.7	34.2	15.8	76.1	26.5 - 45.5	36.7	13.3	0.669
Acetaldehyde	19.7	7.4	80.0	11.8 - 22.0	21.8	15.1	16.3	6.7	80.0	12.0 - 29.6	23.7	17.0	0.986
Acetone	18.0	9.3	60.3	16.7 - 28.8	23.1	11.2	23.6	8.0	113.0	15.5 - 41.2	31.3	24.2	0.182
Acrolein	ND	ND	ND	ND - ND	ND	0.0	ND	ND	ND	ND - ND	ND	0.0	1.000
Propionaldehyde	5.9	2.2	36.7	3.5 - 7.5	6.9	6.1	4.7	1.4	36.7	3.4 - 7.5	6.7	5.9	0.759
Crotonaldehyde	ND	ND	8.4	ND - 1.4	0.7	1.4	ND	ND	8.4	ND - ND	0.7	1.2	0.897
n-Butyraldehyde	1.2	ND	6.5	ND - 1.4	1.2	1.1	1.1	ND	6.5	ND - 1.9	1.6	1.7	0.426
Benzaldehyde	1.2	ND	4.4	ND - 1.8	1.3	0.9	1.1	ND	44.6	ND - 2.5	2.7	6.9	0.597
iso-Valeraldehyde	ND	ND	ND	ND - ND	ND	0.0	ND	3.4	ND	ND - ND	0.6	0.4	0.418
Valeraldehyde	1.6	ND	7.9	ND - 2.6	1.8	1.4	1.2	ND	11.2	ND - 2.8	2.0	2.3	0.346
Total m,o,p-Tolualdehyde	ND	ND	9.9	ND - ND	1.1	1.8	ND	9.9	ND	ND - 1.2	1.3	1.8	0.516
Hexaldehyde	9.2	2.7	34.9	3.7 - 11.1	8.4	6.0	5.6	ND	42.5	3.7 - 12.4	9.3	9.2	0.851
2,5-Dimethylaldehyde	ND	ND	ND	ND - ND	ND	0.0	ND	1.5	ND	ND - ND	0.5	0.1	0.509
Total aldehyde	97.3	48.5	268.3	87.2 - 117.2	103.4	41.8	96.4	43.6	283.6	74.2 - 123.6	118.0	64.4	0.978
VOC類													
2-Butanone(Ethyl Methyl Ketone)	1.8	ND	10.0	1.0 - 3.2	2.5	2.1	2.2	ND	10.0	1.6 - 3.6	2.7	1.7	0.185
Ethyl acetate	5.7	1.4	35.5	3.1 - 12.1	8.3	7.4	6.8	ND	36.8	3.9 - 12.0	8.7	7.2	0.551
n-Hexane	ND	ND	7.8	ND - 1.7	1.4	1.8	ND	ND	7.8	ND - 1.3	1.2	1.4	0.577
Chloroform	ND	ND	3.0	ND - ND	0.6	0.4	ND	ND	3.0	ND - ND	0.5	0.3	0.821
2,4-Dimethylpentane	ND	ND	ND	ND - ND	ND	0.0	ND	ND	ND	ND - ND	ND	0.0	1.000
1,2-Dichloroethane	ND	ND	ND	ND - ND	ND	0.0	ND	ND	ND	ND - ND	ND	0.0	1.000
1,1,1-Trichloroethane	ND	ND	4.4	ND - ND	0.6	0.7	ND	ND	4.4	ND - ND	0.6	0.4	0.955
n-Butanol	ND	ND	4.6	ND - 1.5	1.1	1.0	ND	ND	9.5	ND - 1.6	1.4	1.7	0.734
Benzene	ND	ND	3.0	ND - 0.6	0.8	0.5	ND	ND	3.0	ND - 1.1	0.9	0.7	0.420
Carbon tetrachloride	ND	ND	ND	ND - ND	ND	0.0	ND	ND	ND	ND - ND	ND	0.0	1.000
1,2-Dichloropropane	ND	ND	ND	ND - ND	ND	0.0	ND	ND	ND	ND - ND	ND	0.0	1.000
Trichloroethylene	ND	ND	ND	ND - ND	ND	0.0	ND	ND	ND	ND - ND	ND	0.0	1.000
n-Heptane	ND	ND	9.7	ND - ND	1.3	2.1	ND	ND	24.2	ND - ND	2.1	4.3	0.633
2-Pentanone(Methyl isobutyl ketone)	ND	ND	5.4	ND - 1.1	0.9	0.9	ND	ND	5.4	ND - 1.3	1.1	1.2	0.210
Toluene	13.2	5.4	36.0	9.7 - 17.9	15.1	7.5	15.0	3.3	39.2	10.2 - 23.3	16.9	9.2	0.433
Chlorobromomethane	ND	ND	ND	ND - ND	ND	0.0	ND	ND	ND	ND - ND	ND	0.0	1.000
Butyl acetate	1.3	ND	4.3	ND - 2.5	1.7	1.3	1.9	ND	9.5	ND - 2.8	2.5	2.2	0.116
n-Octane	ND	ND	17.5	ND - 0.6	2.2	4.9	ND	ND	17.5	ND - ND	1.3	2.1	0.976
Tetrachloroethylene	ND	ND	2.0	ND - ND	0.5	0.3	ND	ND	2.2	ND - ND	0.6	0.3	0.789
Ethylbenzene	2.8	1.0	12.4	1.7 - 3.7	3.6	3.1	3.0	ND	12.4	1.7 - 4.4	3.6	2.4	0.734
Total m,o,p-Xylene	4.4	2.0	38.7	2.7 - 6.0	8.0	10.3	4.9	ND	38.7	2.9 - 10.8	7.5	6.5	0.287
Styrene	ND	ND	ND	ND - ND	ND	0.0	ND	ND	ND	ND - ND	ND	0.0	1.000
n-Nonane	ND	ND	35.2	ND - 0.9	4.2	10.0	ND	ND	35.2	ND - 2.3	2.5	4.5	0.596
alpha-Pinene	5.3	ND	116.2	3.1 - 23.5	16.2	22.4	9.1	ND	1052.7	3.1 - 34.4	52.6	166.2	0.299
Total Trimethylbenzene	2.6	ND	32.6	ND - 3.8	6.3	10.1	3.3	ND	32.6	2.1 - 6.2	5.5	6.9	0.235
n-Decane	2.7	ND	28.2	1.8 - 4.5	5.7	8.1	3.1	ND	28.2	2.1 - 6.6	5.6	5.7	0.165
p-Dichlorobenzene	10.5	ND	429.1	1.4 - 39.6	73.6	130.4	6.6	ND	1407.5	1.3 - 44.4	99.4	227.4	0.775
Limonene	7.7	1.4	108.6	4.4 - 30.0	23.6	30.2	10.1	1.2	108.6	5.0 - 26.8	21.1	25.4	0.932
n-Undecane	1.5	ND	37.1	1.2 - 4.3	6.8	11.6	1.8	ND	44.3	1.2 - 9.5	7.5	11.5	0.438
TVOC	112.5	48.9	470.1	75.2 - 324.1	188.8	141.4	148.4	46.5	1527.1	70.5 - 314.4	248.5	298.6	0.910

Mann-Whitney検定

厚生労働科学研究補助金（健康科学総合研究事業）
分担研究報告書

アルデヒド類・VOC類の空气中濃度とSHS1との関係(大阪)

単位: $\mu\text{g}/\text{m}^3$

N=283人

	SHS1症状あり(N=11)					SHS1症状なし(N=272)					Mean	SD	p
	Median	Min	Max	25%	75%	Median	Min	Max	25%	75%			
アルデヒド類													
Formaldehyde	1.1	ND	89.0	ND	66.5	30.1	ND	153.0	1.7	46.7	31.5	27.8	0.379
Acetaldehyde	1.3	ND	44.1	ND	40.0	18.1	ND	83.4	7.0	28.8	20.3	16.8	0.333
Acetone	ND	ND	85.5	ND	44.9	27.8	ND	510.1	16.7	46.1	37.7	60.4	0.038
Acrolein	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0	1.000
Propionaldehyde	ND	ND	18.8	ND	17.4	6.7	8.7	27.0	ND	14.8	8.8	8.0	0.287
Crotonaldehyde	ND	ND	11.9	ND	10.7	4.2	5.2	16.0	ND	9.1	5.1	5.0	0.410
n-Butyraldehyde	ND	ND	17.3	ND	8.9	4.4	5.5	19.5	ND	6.2	4.0	4.5	0.931
Benzaldehyde	ND	ND	13.1	ND	9.3	3.2	5.5	25.2	ND	11.2	6.4	6.8	0.171
iso-Valeraldehyde	ND	ND	11.8	ND	8.3	2.3	4.9	22.7	ND	10.1	5.7	6.3	0.322
Valeraldehyde	2.4	ND	20.2	ND	13.8	4.3	7.9	201.2	ND	10.8	8.7	21.6	0.710
Total m.o.p-Tolualdehyde	ND	ND	3.9	ND	3.4	1.7	1.5	14.7	ND	3.8	2.5	2.7	0.340
Hexaldehyde	14.9	ND	27.7	1.9	22.4	8.6	9.7	104.4	4.5	16.3	12.9	14.8	0.936
2,5-Dimethylaldehyde	ND	ND	1.6	ND	ND	ND	0.3	3.9	ND	ND	0.7	0.6	0.693
Total aldehyde	24.0	7.0	324.0	9.9	267.1	128.3	7.0	661.0	68.6	206.2	145.1	111.9	0.113
VOC類													
2-Butanone(Ethyl Methyl Ketone)	ND	ND	ND	ND	ND	ND	ND	5.2	ND	ND	0.8	0.8	0.192
Ethyl acetate	ND	ND	ND	ND	ND	ND	ND	147.4	ND	ND	3.9	17.9	0.104
n-Hexane	ND	ND	ND	ND	ND	ND	ND	12.7	ND	ND	0.7	1.1	0.327
Chloroform	ND	ND	2.3	ND	ND	ND	0.5	4.9	ND	ND	0.9	0.9	0.317
2,4-Dimethylpentane	ND	ND	1.1	ND	ND	ND	0.2	2.0	ND	ND	0.7	0.4	0.963
1,2-Dichloroethane	ND	ND	1.8	ND	ND	ND	0.5	2.5	ND	ND	0.6	0.3	0.055
1,1,1-Trichloroethane	ND	ND	1.2	ND	ND	ND	0.2	4.2	ND	ND	0.6	0.4	0.274
n-Butanol	ND	ND	ND	ND	ND	ND	0.0	2.6	ND	ND	0.6	0.4	0.237
Benzene	2.6	ND	4.2	ND	4.2	1.1	2.3	5.2	ND	2.2	1.5	1.2	0.084
Carbon tetrachloride	ND	ND	ND	ND	ND	ND	0.0	1.3	ND	ND	0.5	0.1	0.591
1,2-Dichloropropane	ND	ND	ND	ND	ND	ND	0.0	ND	ND	ND	ND	0.0	1.000
Trichloroethylene	ND	ND	ND	ND	ND	ND	0.0	ND	ND	ND	ND	0.0	1.000
n-Heptane	ND	ND	1.0	ND	ND	ND	0.5	23.1	ND	1.3	1.7	3.1	0.025*
2-Pentanone(Methylisobutylketone)	1.9	ND	3.5	ND	2.7	ND	1.8	10.7	ND	ND	1.4	2.3	0.014*
Toluene	1ND	ND	43.4	9.8	14.2	8.7	13.9	43.4	4.8	14.1	10.1	7.3	0.066
Chlorodibromomethane	ND	ND	ND	ND	ND	ND	0.0	ND	ND	ND	ND	0.0	1.000
Butyl acetate	2.3	1.1	48.2	1.3	5.0	2.4	18.6	48.2	1.3	3.9	3.2	4.5	0.501
n-Octane	ND	ND	3.8	ND	ND	ND	0.8	6.2	ND	ND	0.9	1.2	0.777
Tetrachloroethylene	ND	ND	ND	ND	ND	ND	0.0	2.6	ND	ND	0.5	0.3	0.686
Ethylbenzene	1.6	1.0	4.3	1.4	1.7	1.6	2.0	15.5	1.1	2.7	2.1	1.9	0.609
Total m.o.p-Xylene	3.3	2.1	8.4	2.9	3.6	3.2	4.0	27.4	2.2	5.1	4.5	4.3	0.434
Styrene	ND	ND	ND	ND	ND	ND	0.0	ND	ND	ND	0.5	0.3	0.497
n-Nonane	ND	ND	ND	ND	ND	ND	0.0	3.7	ND	ND	0.7	0.6	0.274
alpha-Pinene	11.3	1.6	240.7	1.6	41.1	9.2	34.7	498.9	2.1	35.7	32.9	63.4	0.779
Total Trimethylbenzene	ND	ND	2.7	ND	ND	ND	0.7	6.4	ND	2.1	1.3	1.4	0.160
n-Decane	ND	ND	4.2	ND	ND	ND	1.2	7.6	ND	ND	0.9	1.3	0.348
p-Dichlorobenzene	5.9	ND	65.9	ND	35.1	1.1	16.8	167.2	ND	13.7	12.3	25.6	0.200
Limonene	13.8	5.4	116.6	9.4	110.1	5.4	40.2	116.6	2.8	12.0	11.1	17.0	0.001**
n-Undecane	1.1	ND	1.8	ND	1.1	ND	0.9	6.6	ND	1.1	0.9	1.0	0.166
TVOC	165.6	57.8	283.7	57.8	195.5	75.7	17.2	622.4	48.7	108.6	97.8	83.1	0.032*

Mann-Whitney検定

厚生労働科学研究補助金（健康科学総合研究事業）
分担研究報告書

アルデヒド類・VOC類の気中濃度とSHS2との関係(大阪)

単位: $\mu\text{g}/\text{m}^3$ N=283人

	SHS2症状あり(N=30)					SHS2症状なし(N=253)							
	Median	Min	Max	25% - 75%	Mean	SD	Median	Min	Max	25% - 75%	Mean	SD	p
アルデヒド類													
Formaldehyde	25.4	ND	89.0	ND - 51.0	27.9	27.2	30.1	ND	153.0	1.7 - 46.5	31.6	28.1	0.610
Acetaldehyde	17.3	ND	51.5	ND - 35.0	17.5	16.9	18.1	ND	83.4	7.6 - 28.8	20.4	16.9	0.435
Acetone	24.8	ND	85.5	ND - 44.9	23.5	23.1	27.2	ND	510.1	16.6 - 45.2	38.3	62.4	0.347
Acrolein	ND	ND	ND	ND - ND	ND	0.0	ND	ND	ND	ND - ND	ND	0.0	1.000
Propionaldehyde	9.0	ND	25.5	ND - 17.9	9.2	8.4	6.5	ND	27.0	ND - 14.6	8.7	8.0	0.767
Crotonaldehyde	ND	ND	12.9	ND - 9.1	4.8	4.9	3.0	ND	16.0	ND - 9.1	5.1	5.0	0.579
n-Butyraldehyde	2.8	ND	17.3	ND - 8.9	5.0	5.8	1.9	ND	19.5	ND - 6.0	3.9	4.4	0.572
Benzaldehyde	1.3	ND	19.4	ND - 11.3	6.2	6.6	3.2	ND	25.2	ND - 11.2	6.4	6.8	0.569
iso-Valeraldehyde	ND	ND	17.4	ND - 10.2	5.6	6.0	2.3	ND	22.7	ND - 10.1	5.6	6.2	0.877
Valeraldehyde	4.0	ND	20.2	ND - 8.9	6.1	6.3	4.3	ND	201.2	ND - 10.9	8.9	22.3	0.955
Total m,o,p-Tolualdehyde	2.6	ND	10.8	ND - 3.3	2.5	2.8	ND	ND	14.7	ND - 3.9	2.5	2.7	0.925
Hexaldehyde	8.7	ND	27.7	3.5 - 18.6	10.8	8.2	8.6	ND	104.4	4.5 - 16.3	13.1	15.2	0.781
2,5-Dimethylaldehyde	ND	ND	3.9	ND - ND	0.8	0.9	ND	ND	3.9	ND - ND	0.7	0.5	0.699
Total aldehyde	114.7	7.0	324.0	24.0 - 229.2	122.8	102.7	122.6	7.0	661.0	68.8 - 206.2	145.9	113.5	0.281
VOC類													
2-Butanone(Ethyl Methyl Ketone)	ND	ND	2.8	ND - ND	0.7	0.6	ND	ND	5.2	ND - ND	0.8	0.8	0.957
Ethyl acetate	ND	ND	147.4	ND - ND	6.6	26.8	ND	ND	147.4	ND - ND	3.4	16.1	0.810
n-Hexane	ND	ND	2.0	ND - ND	0.6	0.3	ND	ND	12.7	ND - ND	0.7	1.2	0.327
Chloroform	ND	ND	4.9	ND - ND	0.9	1.1	ND	ND	4.9	ND - ND	0.9	0.8	0.507
2,4-Dimethylpentane	ND	ND	1.3	ND - ND	0.6	0.2	ND	ND	2.0	ND - ND	0.7	0.4	0.525
1,2-Dichloroethane	ND	ND	1.8	ND - ND	0.6	0.4	ND	ND	2.5	ND - ND	0.6	0.3	0.232
1,1,1-Trichloroethane	ND	ND	1.2	ND - ND	0.5	0.1	ND	ND	4.2	ND - ND	0.6	0.4	0.981
n-Butanol	ND	ND	2.4	ND - ND	0.6	0.4	ND	ND	2.6	ND - ND	0.6	0.4	0.835
Benzene	ND	ND	4.2	ND - 2.8	1.6	1.4	1.2	ND	5.2	ND - 2.2	1.5	1.1	0.837
Carbon tetrachloride	ND	ND	ND	ND - ND	ND	0.0	ND	ND	1.3	ND - ND	0.5	0.1	0.357
1,2-Dichloropropane	ND	ND	ND	ND - ND	ND	0.0	ND	ND	ND	ND - ND	ND	0.0	1.000
Trichloroethylene	ND	ND	ND	ND - ND	ND	0.0	ND	ND	ND	ND - ND	ND	0.0	1.000
n-Heptane	ND	ND	23.1	ND - ND	1.3	4.1	ND	ND	23.1	ND - 1.3	1.7	2.9	0.002
2-Pentanone(Methyl isobutyl ketone)	ND	ND	3.5	ND - 2.7	1.4	1.2	ND	ND	10.7	ND - ND	1.4	2.4	0.079
Toluene	IND	ND	43.4	7.0 - 14.3	12.5	10.4	8.5	ND	43.4	4.9 - 13.9	10.1	7.3	0.226
Chlorobromomethane	ND	ND	ND	ND - ND	ND	0.0	ND	ND	ND	ND - ND	ND	0.0	1.000
Butyl acetate	2.5	ND	48.2	1.4 - 4.9	5.9	11.6	2.4	ND	48.2	1.3 - 3.7	3.2	4.6	0.280
n-Octane	ND	ND	3.8	ND - ND	0.7	0.8	ND	ND	6.2	ND - ND	0.9	1.2	0.718
Tetrachloroethylene	ND	ND	2.6	ND - ND	0.6	0.4	ND	ND	2.6	ND - ND	0.5	0.2	0.347
Ethylbenzene	1.7	ND	5.1	1.4 - 2.7	2.1	1.2	1.6	ND	15.5	1.1 - 2.7	2.1	1.9	0.241
Total m,o,p-Xylene	3.3	ND	20.9	2.4 - 5.8	4.4	3.7	3.1	ND	27.4	2.2 - 5.0	4.5	4.3	0.453
Styrene	ND	ND	ND	ND - ND	ND	0.0	ND	ND	3.2	ND - ND	0.6	0.3	0.245
n-Nonane	ND	ND	3.7	ND - ND	0.8	0.8	ND	ND	3.7	ND - ND	0.7	0.6	0.859
alpha-Pinene	14.4	ND	240.7	1.9 - 42.7	38.3	59.5	9.1	ND	498.9	2.1 - 32.7	32.3	64.0	0.490
Total Trimethylbenzene	ND	ND	6.1	ND - 2.1	1.3	1.5	ND	ND	6.4	ND - 2.1	1.2	1.4	0.888
n-Decane	ND	ND	4.2	ND - 0.9	1.1	1.2	ND	ND	7.6	ND - ND	0.8	1.3	0.017
p-Dichlorobenzene	ND	ND	65.9	ND - 11.2	10.6	18.4	1.1	ND	167.2	ND - 13.7	12.7	26.1	0.474
Limonene	12.1	ND	116.6	5.8 - 21.3	25.7	36.5	5.4	ND	110.1	2.8 - 11.6	10.6	16.1	0.000
n-Undecane	ND	ND	5.7	ND - 1.1	0.9	1.0	ND	ND	6.6	ND - 1.1	0.9	1.0	0.865
TVOC	108.8	22.7	287.0	57.8 - 180.5	123.6	75.5	75.6	17.2	622.4	48.7 - 106.8	96.6	83.6	0.024*

Mann-Whitney検定

厚生労働科学研究補助金（健康科学総合研究事業）
分担研究報告書

アルキド類・VOC類の気中濃度とSHS1との関係(岡山)

単位: $\mu\text{g}/\text{m}^3$ N=260人

	SHS1症状あり(N=17)					SHS1症状なし(N=243)					Mean	SD	P
	Median	Min	Max	25%	75%	Median	Min	Max	25%	75%			
アルキド類													
Formaldehyde	39.0	17.2	71.9	28.7	54.5	36.6	12.2	112.4	24.9	48.0	40.0	20.1	0.412
Acetaldehyde	19.1	1.3	48.5	13.5	26.2	15.5	1.3	208.9	12.1	25.2	22.7	23.0	0.410
Acetone	28.6	15.7	50.6	24.9	34.8	27.7	10.8	104.8	19.9	36.1	32.1	17.5	0.696
Acrolein	ND	ND	ND	ND	ND	ND	ND	6.1	ND	ND	0.5	0.4	0.791
Propionaldehyde	6.4	ND	23.5	4.3	11.0	6.4	ND	127.1	4.5	12.0	11.0	16.6	0.592
Crotonaldehyde	ND	ND	29.9	ND	4.4	ND	ND	29.9	ND	2.7	3.2	5.6	0.606
n-Butyraldehyde	1.4	ND	9.5	ND	2.4	1.1	ND	12.8	ND	2.1	2.3	2.8	0.442
Benzaldehyde	2.0	ND	67.8	1.1	6.4	1.6	ND	67.8	ND	5.6	6.7	12.8	0.325
iso-Valeraldehyde	ND	ND	51.8	ND	ND	ND	ND	51.8	ND	2.0	4.7	10.0	0.471
Valeraldehyde	1.5	ND	14.3	ND	2.3	1.3	ND	33.2	ND	2.8	3.7	6.3	0.784
Total m.o.p-Tolualdehyde	ND	ND	14.6	ND	2.0	ND	ND	18.9	ND	2.6	2.8	4.6	0.958
Hexaldehyde	7.4	1.8	35.7	2.6	11.1	4.9	ND	49.0	3.3	15.5	10.2	11.0	0.839
2,5-Dimethylaldehyde	ND	ND	12.6	ND	ND	ND	ND	12.6	ND	ND	0.8	1.7	0.944
Total aldehyde	132.6	67.4	288.2	85.4	145.2	103.3	47.5	397.1	75.3	193.3	141.0	89.2	0.417
VOC類													
2-Butanone(Ethyl Methyl Ketone)	ND	ND	7.4	ND	2.4	ND	ND	13.3	ND	2.8	2.2	2.8	0.636
Ethyl acetate	2.5	ND	21.2	1.8	8.9	2.9	ND	37.2	ND	6.5	5.3	7.0	0.574
n-Hexane	ND	ND	7.9	ND	2.9	ND	ND	38.0	ND	2.2	2.1	4.2	0.605
Chloroform	ND	ND	4.1	ND	ND	ND	ND	5.9	ND	ND	0.9	1.1	0.238
2,4-Dimethylpentane	ND	ND	1.8	ND	ND	ND	ND	2.9	ND	ND	0.5	0.3	0.496
1,2-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0	1.000
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	1.4	ND	1.2	0.5	0.2	0.310
n-Butanol	ND	ND	11.0	ND	1.9	1.3	ND	11.0	ND	1.2	1.0	1.1	0.311
Benzene	1.8	ND	13.8	ND	5.9	3.6	ND	21.7	ND	4.7	3.1	3.7	0.456
Carbon tetrachloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0	1.000
1,2-Dichloropropane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0	1.000
Trichloroethylene	ND	ND	ND	ND	ND	ND	ND	3.3	ND	ND	0.6	0.4	0.395
n-Heptane	ND	ND	10.4	ND	3.7	ND	ND	129.6	ND	2.0	3.6	12.6	0.368
2-Pentanone(Methylisobutylketone)	ND	ND	ND	ND	ND	ND	ND	12.1	ND	ND	1.1	1.7	0.039
Toluene	11.8	5.2	47.0	8.9	20.3	11.0	2.7	100.3	8.1	20.3	16.2	13.4	0.547
Chlorodibromomethane	ND	ND	ND	ND	ND	ND	ND	6.0	ND	ND	0.6	0.7	0.595
Butyl acetate	1.3	ND	29.2	ND	4.7	1.3	ND	29.2	ND	4.2	2.6	3.2	0.824
n-Octane	ND	ND	3.3	ND	1.8	ND	ND	45.5	ND	1.1	2.0	5.1	0.869
Tetrachloroethylene	ND	ND	ND	ND	ND	ND	ND	1.8	ND	ND	0.5	0.2	0.420
Ethylbenzene	2.3	ND	12.9	1.6	4.1	2.2	ND	24.8	1.5	3.8	3.1	2.9	0.713
Total m.o.p-Xylene	5.1	ND	42.5	2.1	8.1	4.3	ND	101.1	1.8	8.1	6.6	10.5	0.482
Styrene	ND	ND	52.7	ND	ND	3.6	ND	52.7	ND	ND	0.8	3.4	0.624
n-Nonane	2.0	ND	34.0	ND	6.2	6.0	ND	160.0	ND	3.0	5.5	16.1	0.115
alpha-Pinene	4.3	1.3	34.4	3.5	25.2	13.0	12.4	154.7	1.6	22.2	15.0	23.7	0.274
Total Trimethylbenzene	3.7	ND	79.9	2.7	7.6	3.1	ND	103.0	2.3	6.7	6.3	11.4	0.226
n-Decane	1.4	ND	52.3	ND	4.5	6.4	ND	84.7	ND	6.1	5.6	11.2	0.685
p-Dichlorobenzene	1.3	ND	84.5	0.8	17.3	2.3	ND	241.6	1.1	9.8	18.0	41.6	0.592
Limonene	9.0	1.9	103.0	7.0	33.9	11.3	ND	601.6	5.4	28.7	31.2	78.1	0.875
n-Undecane	1.1	ND	101.3	ND	5.5	1.5	ND	101.3	ND	4.4	4.2	8.8	0.939
TVOC	89.9	47.0	585.8	63.3	162.0	96.2	29.5	1147.4	64.6	177.3	141.0	144.1	0.726

Mann-Whitney検定

厚生労働科学研究補助金（健康科学総合研究事業）
分担研究報告書

アルデヒド類・VOC類の気中濃度とSHS2との関係(岡山)

単位: $\mu\text{g}/\text{m}^3$ N=260人

SHS2症状あり(N=40) SHS2症状なし(N=220)

アルデヒド類	SHS2症状あり(N=40)					SHS2症状なし(N=220)				
	Median	Min	Max	25% - 75%	Mean SD	Median	Min	Max	25% - 75%	Mean SD
Formaldehyde	39.5	17.2	112.4	28.1 - 54.5	44.6 21.4	36.2	12.2	112.4	24.8 - 48.0	39.3 19.5 0.081
Acetaldehyde	18.6	1.3	48.8	13.4 - 31.3	22.5 12.4	15.1	1.3	208.9	11.7 - 24.9	22.5 23.8 0.108
Acetone	3ND	15.7	69.8	26.9 - 36.4	33.9 12.7	27.5	10.8	104.8	19.8 - 36.1	31.6 17.8 0.026*
Acrolein	ND	ND	ND	ND - ND	ND 0.0	ND	ND	6.1	ND - ND	0.5 0.4 0.670
Propionaldehyde	8.1	ND	36.1	4.6 - 15.1	10.8 8.5	6.3	ND	127.1	4.5 - 11.9	10.8 17.2 0.182
Crotonaldehyde	ND	ND	29.9	ND - 9.2	4.8 6.6	ND	ND	29.9	ND - 2.2	3.0 5.6 0.013*
n-Butyraldehyde	1.5	ND	12.8	1.1 - 5.9	3.4 3.3	1.1	ND	12.8	ND - 2.0	2.0 2.6 0.001**
Benzaldehyde	3.0	ND	67.8	1.2 - 22.9	13.3 19.4	1.4	ND	67.8	ND - 4.2	5.6 11.2 0.001**
iso-Valeraldehyde	ND	ND	51.8	ND - 17.6	9.3 15.3	ND	ND	51.8	ND - 1.3	3.8 8.7 0.055
Valeraldehyde	2.1	ND	24.7	ND - 5.0	5.3 7.5	1.3	ND	33.2	ND - 2.5	3.3 5.9 0.049*
Total m.o.p-Tolualdehyde	ND	ND	15.5	ND - 10.8	4.5 5.9	ND	ND	18.9	ND - 1.6	2.5 4.3 0.087
Hexaldehyde	9.5	ND	35.7	3.3 - 20.1	12.8 10.3	4.8	ND	49.0	2.8 - 10.0	9.7 11.0 0.025*
2,5-Dimethylaldehyde	ND	ND	12.6	ND - ND	1.5 3.2	ND	ND	12.6	ND - ND	0.7 1.4 0.015*
Total aldehyde	138.2	67.1	368.6	103.7 - 229.7	167.5 82.9	102.2	47.5	397.1	73.1 - 171.5	135.8 87.9 0.002**
VOC類										
2-Butanone(Ethyl Methyl Ketone)	ND	ND	7.4	ND - 1.9	1.3 1.5	1.1	ND	13.3	ND - 3.2	2.3 2.9 0.034*
Ethyl acetate	2.5	ND	37.2	0.8 - 8.7	5.5 7.0	2.9	ND	37.2	ND - 6.5	5.2 6.9 0.780
n-Hexane	ND	ND	7.9	ND - 1.9	1.8 2.0	ND	ND	38.0	ND - 2.3	2.2 4.3 0.539
Chloroform	ND	ND	4.5	ND - 1.2	1.3 1.4	ND	ND	5.9	ND - ND	0.8 1.0 0.034*
2,4-Dimethylpentane	ND	ND	1.8	ND - ND	0.6 0.3	ND	ND	2.9	ND - ND	0.5 0.3 0.083
1,2-Dichloroethane	ND	ND	ND	ND - ND	ND 0.0	ND	ND	ND	ND - ND	ND 0.0 1.000
1,1,1-Trichloroethane	ND	ND	ND	ND - ND	ND 0.0	ND	ND	1.4	ND - ND	0.5 0.2 0.102
n-Butanol	ND	ND	11.0	ND - 1.6	1.2 1.8	ND	ND	11.0	ND - 1.2	1.0 1.1 0.777
Benzene	0.8	ND	13.8	ND - 5.8	3.2 4.1	1.3	ND	21.7	ND - 4.7	3.1 3.6 0.706
Carbon tetrachloride	ND	ND	ND	ND - ND	ND 0.0	ND	ND	ND	ND - ND	ND 0.0 1.000
1,2-Dichloropropane	ND	ND	ND	ND - ND	ND 0.0	ND	ND	ND	ND - ND	ND 0.0 1.000
Trichloroethylene	ND	ND	ND	ND - ND	ND 0.0	ND	ND	3.3	ND - ND	0.6 0.4 0.170
n-Heptane	ND	ND	15.2	ND - 3.7	2.5 3.6	ND	ND	129.6	ND - 2.0	3.7 13.1 0.687
2-Pentanone(Methylisobutylketone)	ND	ND	5.8	ND - ND	0.7 0.9	ND	ND	12.1	ND - ND	1.1 1.8 0.015*
Toluene	11.7	5.2	47.0	8.0 - 20.3	15.1 9.8	11.2	2.7	100.3	8.1 - 20.3	16.3 13.7 0.914
Chlorodibromomethane	ND	ND	6.0	ND - ND	0.6 0.9	ND	ND	6.0	ND - ND	0.6 0.6 0.592
Buyl acetate	1.3	ND	29.2	ND - 4.0	3.4 5.4	1.4	ND	29.2	ND - 4.1	2.6 3.1 0.950
n-Octane	ND	ND	3.7	ND - 1.5	1.1 1.0	ND	ND	45.5	ND - 1.1	2.0 5.3 0.946
Tetrachloroethylene	2.3	ND	12.9	2.1 - 4.5	3.3 2.2	2.2	ND	1.8	1.5 - 3.8	0.5 0.2 0.194
Ethylbenzene	5.1	ND	42.5	3.9 - 8.7	6.6 6.8	4.1	ND	101.1	1.6 - 8.1	3.1 3.0 0.157
Total m.o.p-Xylene	ND	ND	52.7	ND - ND	1.8 8.3	ND	ND	52.7	ND - ND	0.8 3.5 0.651
Styrene	1.4	ND	34.0	ND - 6.2	7.6 7.6	ND	ND	160.0	ND - 3.0	5.6 16.8 0.153
n-Nonane	4.3	1.3	58.0	2.8 - 24.1	13.2 13.6	4.5	ND	154.7	1.5 - 21.9	15.2 24.4 0.118
alpha-Pinene	3.7	ND	79.9	2.4 - 7.4	7.0 12.7	3.0	ND	103.0	2.3 - 6.7	6.4 11.9 0.444
Total Trimethylbenzene	ND	ND	52.3	ND - 6.0	4.8 9.2	ND	ND	84.7	ND - 5.6	5.8 11.6 0.727
n-Decane	1.3	ND	241.6	ND - 6.2	20.5 51.4	2.4	ND	241.6	1.1 - 12.7	17.1 38.5 0.283
p-Dichlorobenzene	9.0	ND	601.6	4.5 - 31.8	37.2 96.4	11.6	ND	601.6	6.3 - 28.7	29.8 71.8 0.488
Limonene	1.1	ND	101.3	ND - 4.4	5.5 16.1	1.5	ND	101.3	ND - 4.4	4.4 9.2 0.392
n-Undecane	75.8	34.0	673.5	60.1 - 196.5	146.3 145.0	97.7	29.5	1147.4	67.4 - 171.3	139.9 143.6 0.519
TVOC										

Mann-Whitney検定

厚生労働科学研究補助金（健康科学総合研究事業）
分担研究報告書

アルデヒド類・VOC類の気中濃度とSHS1との関係（北九州）

単位：μg/m³

N = 164人

	SHS1症状あり(N=22)					SHS1症状なし(N=142)					Mean	SD	P
	Median	Min	Max	25%	75%	Median	Min	Max	25%	75%			
アルデヒド類													
Formaldehyde	36.2	9.2	67.1	29.4	51.9	44.7	9.2	164.4	33.2	54.1	47.8	21.9	0.038*
Acetaldehyde	13.3	2.2	37.6	10.0	21.5	21.6	2.2	62.0	13.5	31.4	23.3	13.4	0.008*
Acetone	60.5	32.8	257.2	45.9	72.1	68.2	ND	337.1	55.6	120.3	100.8	81.0	0.047*
Acrolein	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0	1.000
Propionaldehyde	14.7	9.1	35.4	11.9	17.9	16.9	8.9	35.4	14.7	20.0	17.9	4.8	0.010*
Crotonaldehyde	9.4	3.9	26.1	8.1	11.5	10.8	1.7	26.1	9.0	13.3	11.2	4.1	0.049*
n-Butyraldehyde	6.8	ND	23.3	6.1	16.9	8.6	ND	109.5	6.0	15.7	14.6	20.9	0.490
Benzaldehyde	21.8	4.5	100.3	16.0	28.4	17.4	4.3	100.3	12.4	35.8	26.4	20.1	0.512
iso-Valeraldehyde	19.5	1.9	89.8	14.3	25.4	14.6	1.9	89.8	8.6	32.0	22.0	18.7	0.271
Valeraldehyde	13.5	ND	50.6	9.7	22.0	12.0	ND	64.6	6.0	23.1	17.0	15.7	0.706
Total m.o.p-Tolualdehyde	ND	ND	31.4	ND	ND	ND	ND	222.9	ND	ND	5.0	26.7	0.615
Hexaldehyde	6.3	3.1	108.0	4.9	9.9	9.6	2.9	108.0	6.7	17.6	14.6	15.6	0.051
2,5-Dimethylaldehyde	ND	ND	4.4	ND	ND	ND	ND	19.6	ND	ND	1.1	3.2	0.745
Total aldehyde	212.1	183.0	398.6	184.4	297.5	272.4	166.8	647.8	227.6	366.1	302.8	107.1	0.003**
VOC類													
2-Butanone(Ethyl Methyl Ketone)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0	1.000
Ethyl acetate	ND	ND	33.4	ND	ND	ND	ND	36.6	ND	ND	1.2	5.1	0.504
n-Hexane	ND	ND	66.0	ND	ND	ND	ND	66.0	ND	ND	1.0	5.5	0.780
Chloroform	ND	ND	2.2	ND	ND	ND	ND	2.5	ND	ND	0.6	0.3	0.938
2,4-Dimethylpentane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0	1.000
1,2-Dichloroethane	ND	ND	6.5	ND	1.2	ND	ND	6.5	ND	ND	0.6	0.6	0.001
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0	1.000
n-Butanol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0	1.000
Benzene	1.8	ND	4.6	ND	2.3	ND	ND	3.7	ND	2.1	1.4	1.1	0.086
Carbon tetrachloride	ND	ND	1.4	ND	ND	ND	ND	1.4	ND	ND	0.6	0.2	0.948
1,2-Dichloropropane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0	1.000
Trichloroethylene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0	1.000
n-Heptane	ND	ND	2.9	ND	ND	ND	ND	19.7	ND	1.7	1.7	2.9	0.115
2-Pentanone(Methylisobutylketone)	ND	ND	7.9	ND	1.4	ND	ND	7.9	ND	1.2	0.9	1.0	0.154
Toluene	8.8	4.9	24.9	7.4	10.6	10.7	4.6	29.6	8.9	14.6	11.8	4.8	0.011*
Chlorodibromomethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0	1.000
Butyl acetate	1.0	ND	13.0	ND	4.7	2.7	ND	13.0	ND	6.0	3.7	3.4	0.169
n-Octane	ND	ND	11.7	ND	ND	ND	ND	11.7	ND	1.1	1.4	2.2	0.296
Tetrachloroethylene	ND	ND	4.7	ND	ND	ND	ND	4.7	ND	ND	0.6	0.6	0.859
Ethylbenzene	2.1	ND	12.7	1.2	3.9	2.9	2.9	12.7	1.7	4.4	3.4	2.4	0.063
Total m.o.p-Xylene	4.0	ND	32.3	2.8	5.9	5.7	ND	32.3	3.3	7.9	6.8	5.8	0.063
Styrene	ND	ND	ND	ND	ND	ND	ND	5.5	ND	ND	0.7	0.7	0.141
n-Nonane	ND	ND	6.5	ND	1.8	ND	ND	22.1	ND	1.3	2.2	3.7	0.609
alpha-Pinene	2.0	ND	28.2	ND	4.3	6.3	ND	411.4	2.1	2ND	28.1	65.5	0.002**
Total Trimethylbenzene	ND	ND	36.6	ND	4.5	ND	ND	36.6	ND	2.7	2.3	4.1	0.485
n-Decane	ND	ND	13.6	ND	2.3	1.1	ND	14.9	ND	3.4	2.5	3.3	0.141
p-Dichlorobenzene	4.1	ND	1689.8	ND	16.5	3.3	ND	1689.8	ND	14.7	84.7	263.2	0.754
Limonene	2.4	ND	10.6	1.2	5.4	5.3	ND	371.8	1.7	10.7	14.3	44.5	0.054
n-Undecane	ND	ND	21.5	ND	2.9	5.6	ND	49.9	ND	1.7	5.4	12.7	0.654
TVOC	50.1	27.1	1770.9	38.9	96.2	87.5	22.1	1770.9	48.8	170.6	180.0	280.8	0.057

Mann-Whitney検定

厚生労働科学研究補助金（健康科学総合研究事業）
分担研究報告書

アルデヒド類・VOC類の気中濃度とSHS2との関係（北九州）

単位：μg/m³ N=164人

	SHS2症状あり(N=98)					SHS2症状なし(N=125)					Mean	SD	P	
	Median	Min	Max	25%	75%	Median	Min	Max	25%	75%				
アルデヒド類														
Formaldehyde	34.8	9.2	8ND	29.4	51.9	45.5	9.2	164.4	34.8	53.9	48.6	22.3	0.006*	
Acetaldehyde	12.7	2.2	51.6	10.0	20.3	22.2	2.2	62.0	15.9	31.6	24.4	13.3	0.000**	
Acetone	60.7	ND	260.4	41.8	68.9	71.6	ND	337.1	55.9	124.4	102.6	80.8	0.014*	
Acrolein	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0	1.000	
Propionaldehyde	15.2	9.1	35.4	12.5	17.9	17.0	8.9	35.4	14.7	20.1	18.1	4.9	0.008*	
Crotonaldehyde	10.0	3.9	26.1	8.7	11.4	11.1	1.7	26.1	9.0	13.3	11.2	4.3	0.075	
n-Butyraldehyde	8.5	ND	109.5	6.3	15.5	8.6	ND	109.5	5.5	16.4	14.6	20.5	0.457	
Benzaldehyde	22.1	4.5	100.3	16.4	30.8	16.4	4.3	100.3	11.9	35.8	26.5	21.1	0.194	
iso-Valeraldehyde	19.8	1.9	89.8	14.6	27.6	14.2	1.9	89.8	7.4	32.0	21.9	19.5	0.080	
Valeraldehyde	15.5	ND	50.6	8.1	23.0	11.8	ND	64.6	4.9	23.0	16.7	16.1	0.275	
Total n,o,p-Tolualdehyde	ND	ND	31.4	ND	ND	10.7	ND	222.9	ND	ND	5.1	28.3	0.407	
Hexaldehyde	6.7	3.1	108.0	4.1	9.3	13.1	2.9	108.0	7.0	19.2	15.5	16.2	0.000**	
2,5-Dimethylaldehyde	ND	ND	4.4	ND	ND	ND	ND	19.6	ND	ND	1.2	3.4	0.293	
Total aldehyde	232.9	183.0	398.6	184.7	288.7	276.1	166.8	647.8	228.2	370.2	307.4	110.7	0.003**	
VOC類														
2-Butanone(Ethyl Methyl Ketone)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0	1.000
Ethyl acetate	ND	ND	33.4	ND	ND	ND	ND	36.6	ND	ND	1.3	5.4	0.965	
n-Hexane	ND	ND	66.0	ND	ND	ND	ND	66.0	ND	ND	1.1	5.9	0.310	
Chloroform	ND	ND	2.2	ND	ND	ND	ND	2.5	ND	ND	0.6	0.4	0.444	
2,4-Dimethylpentane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0	1.000	
1,2-Dichloroethane	ND	ND	6.5	ND	ND	ND	ND	6.5	ND	ND	0.6	0.6	0.000**	
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0	1.000	
n-Butanol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0	1.000	
Benzene	1.3	ND	4.6	ND	2.3	1.5	1.1	4.6	ND	2.2	1.4	1.1	0.442	
Carbon tetrachloride	ND	ND	1.4	ND	ND	0.5	0.2	1.4	ND	ND	0.6	0.2	0.636	
1,2-Dichloropropane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0	1.000	
Trichloroethylene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0	1.000	
n-Heptane	ND	ND	2.9	ND	ND	0.8	0.6	2.9	ND	1.7	1.8	3.0	0.018*	
2-Pentanone(Methylisobutylketone)	ND	ND	7.9	ND	1.3	1.5	2.1	7.9	ND	1.2	0.9	0.9	0.218	
Toluene	8.8	4.7	24.9	6.6	10.3	11.6	4.6	29.6	9.1	15.0	12.3	4.9	0.000**	
Chlorodibromomethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0	1.000	
Butyl acetate	1.5	ND	13.0	2.6	4.0	2.9	ND	13.0	ND	6.5	3.9	3.5	0.028*	
n-Octane	ND	ND	11.7	ND	ND	0.9	1.9	11.7	ND	1.3	1.5	2.3	0.03*	
Tetrachloroethylene	1.7	ND	4.7	ND	ND	0.6	0.7	4.7	ND	ND	0.6	0.7	0.373	
Ethylbenzene	3.4	ND	12.7	1.1	3.0	3.1	ND	12.7	1.7	4.4	3.6	2.4	0.000**	
Total n,o,p-Xylene	ND	ND	32.3	2.6	4.3	6.2	ND	32.3	3.5	8.2	7.4	5.9	0.000**	
Styrene	ND	ND	ND	ND	ND	ND	ND	5.5	ND	ND	0.7	0.8	0.037*	
n-Nonane	ND	ND	6.5	ND	1.1	1.4	1.4	6.5	ND	1.9	2.4	3.9	0.199	
alpha-Pinene	2.1	ND	102.8	ND	16.9	6.3	ND	411.4	2.1	20.0	27.6	68.0	0.038*	
Total Trimethylbenzene	ND	ND	36.6	ND	2.1	2.2	5.9	36.6	ND	3.1	2.5	4.3	0.151	
n-Decane	ND	ND	13.6	ND	2.1	1.1	2.3	14.9	ND	4.0	2.7	3.4	0.060	
p-Dichlorobenzene	1.2	ND	1689.8	ND	10.2	3.4	ND	1689.8	1.8	22.5	95.8	278.8	0.046*	
Limonene	2.4	ND	10.9	1.1	5.4	5.4	ND	371.8	1.8	13.7	15.7	47.2	0.005*	
n-Undecane	ND	ND	21.5	ND	1.0	1.9	4.4	49.9	ND	1.8	6.0	13.4	0.340	
TVOC	44.1	22.1	1770.9	38.9	100.5	94.7	22.1	1770.9	49.2	182.7	194.9	295.7	0.000**	

Mann-Whitney検定

表 13 化学物質濃度とアレルギー症状の関連

アレルギー種別	アレルギー症状現在治療中 N=226				アレルギー症状以前治療していた・ない N=1227				漸近有意確率
	Median	Min	Max	25% - 75%	Median	Min	Max	25% - 75%	
Formaldehyde	42	1	203	28 59	40	1	203	28 57	0.931
Acetaldehyde	21	1	130	14 36	23	1	209	14 34	0.583
Acetone	36	1	424	25 64	35	1	606	23 54	0.157
Acrolein	1	1	1	1 1	1	1	6	1 1	0.668
Propionaldehyde	7	1	36	4 14	8	1	127	5 14	0.632
Crotonaldehyde	4	1	113	1 9	4	1	113	1 9	0.903
n-Butyraldehyde	2	1	110	1 6	2	1	110	1 6	0.370
Benzaldehyde	4	1	79	1 10	4	1	117	1 10	0.789
iso-Valeraldehyde	3	1	71	1 8	3	1	105	1 9	0.913
Valeraldehyde	4	1	224	1 11	4	1	224	1 9	0.580
Total o,m,p-Tolualdehyde	1	1	54	1 3	1	1	223	1 3	0.175
Hexaldehyde	9	1	86	5 19	10	1	199	5 19	0.748
2,5-Dimethylaldehyde	1	1	20	1 1	1	1	20	1 1	0.996
TotalAldehyde	171	7	648	98 250	162	7	799	98 240	0.646
VOC類									
2-Butanone (Ethyl Methyl Keton)	1	1	13	1 1	1	1	37	1 2	0.299
Ethylacetate	1	1	313	1 5	1	1	313	1 6	0.182
n - Hexane	1	1	38	1 1	1	1	178	1 1	0.430
Chloroform	1	1	5	1 1	1	1	6	1 1	0.027 *
2,4-Dimethylpentane	1	1	3	1 1	1	1	4	1 1	0.161
1,2-Dichloroethane	1	1	10	1 1	1	1	10	1 1	0.461
1,1,1-Trichloroethane	1	1	4	1 1	1	1	16	1 1	0.233
n-Butanol	1	1	12	1 1	1	1	11	1 1	0.808
Benzene	1	1	22	1 2	1	1	22	1 2	0.239
Carbontetrachloride	1	1	1	1 1	1	1	1	1 1	0.264
1,2-Dichloropropane	1	1	1	1 1	1	1	3	1 1	0.457
trichloroethylene	1	1	3	1 1	1	1	4	1 1	0.160
n - Heptane	1	1	130	1 2	1	1	130	1 3	0.121
2-Pentanone (Methyl isobutyl)	1	1	32	1 1	1	1	32	1 1	0.017 *
Toluene	13	1	100	8 23	13	1	144	8 20	0.660
Chlorodibromomethane	1	1	2	1 1	1	1	6	1 1	0.960
Butylacetate	3	1	61	1 6	3	1	61	1 5	0.941
n - Octane	1	1	46	1 3	1	1	46	1 3	0.397
Tetrachloroethylene	1	1	26	1 1	1	1	167	1 1	0.013 *
Ethylbenzene	3	1	25	2 5	3	1	25	2 5	0.876
Total o,m,p-Xylene	5	1	101	3 12	6	1	101	3 11	0.590
Styrene	1	1	4	1 1	1	1	53	1 1	0.946
n - Nonane	1	1	160	1 5	1	1	160	1 5	0.793
alpha - Pinene	7	1	1053	2 25	8	1	1053	2 28	0.540
Total Trimethylbenzene	3	1	103	1 7	3	1	103	1 5	0.862
n - Decane	1	1	85	1 4	1	1	85	1 3	0.024 *
p - Dichlorobenzene	2	1	1338	1 15	2	1	1690	1 14	0.662
Limonene	9	1	117	3 20	9	1	602	4 20	0.475
n - Undecane	1	1	90	1 2	1	1	101	1 2	0.648
Total VOC	116	22	1394	67 209	109	16	1771	69 202	0.744

Mann-Whitney検定