

Table S5. Results of GC–MS analysis of volatiles extracted by mechanical shock crushing from quartz (Blagodatnoye deposit, Yenisei ridge).

Formula	Name	¹ CAS/(NIST)	² MW	Quartz 86-107.7	
				³ RT, min	⁴ A, %
Aliphatic hydrocarbons					
Paraffins					
CH4	Methane	74-82-8	16	1.85	0.066
C8H18	2,2-Dimethylhexane	590-73-8	114	19.40	0.030
C8H18	n-Octane	111-65-9	114	20.17	0.021
C9H20	n-Nonane	111-84-2	128	24.08	0.011
C10H22	n-Decane	124-18-5	142	27.66	0.025
C13H28	2,4,6-Trimethyldecane	62108-27-4	184	30.99	0.023
C12H26	n-Dodecane	112-40-3	170	34.44	0.361
C13H28	n-Tridecane	629-50-5	184	38.15	0.014
C16H34	5,8-Diethyldodecane	24251-86-3	226	47.76	0.067
C16H34	3-Methylpentadecane	2882-96-4	226	63.23	0.115
C16H34	n-Hexadecane	544-76-3	226	87.81	0.264
C17H36	n-Heptadecane	629-78-7	240	116.85	0.046
Olefins					
C4H8	2-Methyl-1-propene	115-11-7	56	5.95	1.005
C4H8	(E)-2-Butene	624-64-6	56	6.16	0.001
C4H8	2-Butene	107-01-7	56	6.26	0.017
C5H8	1,3-Pentadiene	1574-41-0	68	8.44	0.081
C5H8	(E)-1,3-Pentadiene	2004-70-8	68	8.54	0.101
C5H8	(Z)-1,3-Pentadiene	1574-41-0	68	8.81	0.009
C6H8	1,3-Cyclohexadiene	592-57-4	80	11.97	0.094
C6H10	(E)-2-Methyl-1,3-pentadiene	926-54-5	82	13.06	0.017
C7H14	1-Heptene	592-76-7	98	15.70	0.015
C7H14	2-Heptene	592-77-8	98	16.10	0.019
C7H8	1,3,5-Cycloheptatriene	544-25-2	92	18.43	0.043
C8H16	(E)-3-Octene	14919-01-8	112	19.53	0.081
C8H16	2-Methyl-2-heptene	627-97-4	112	19.73	0.044
C8H16	(Z)-3-Octene	14850-22-7	112	19.83	0.028
C8H16	(E)-2-Octene	13389-42-9	112	19.93	0.058
C8H16	(Z)-2-Octene	7642-04-8	112	20.07	0.022
C8H16	2-Octene	111-67-1	112	20.30	0.012
C8H14	2,5-Dimethyl-2,4-hexadiene	764-13-6	110	21.15	0.021
C9H18	(Z)-3-Nonene	20237-46-1	126	22.50	0.033
C9H18	3-Nonene	20063-77-8	126	22.86	0.306
C9H18	(E)-2-Nonene	6434-78-2	126	23.00	0.108
C9H18	(Z)-2-Nonene	6434-77-1	126	23.30	0.227
C9H18	2-Nonene	2216-38-8	126	23.60	0.217
C11H22	(E)-4-Methyl-4-decene	60366-66-7	154	30.77	0.008

C ₁₂ H ₂₄	1-Dodecene	112-41-4	168	33.90	0.028
C ₁₃ H ₂₆	(Z)-5-Tridecene	25524-42-9	182	36.75	0.052
C ₁₃ H ₂₆	(E)-5-Tridecene	23051-84-5	182	37.14	0.022
C ₁₃ H ₂₆	(Z)-4-Tridecene	41446-54-2	182	37.69	0.009
C ₁₃ H ₂₆	1-Tridecene	2437-56-1	182	37.88	0.029
C ₁₄ H ₂₈	1-Tetradecene	1120-36-1	196	43.81	0.036
C ₁₅ H ₃₀	1-Pentadecene	13360-61-7	210	53.12	0.024
Cyclic hydrocarbons					
<i>Cycloalkanes (naphthenes) and cycloalkenes</i>					
C ₅ H ₁₀	Cyclopentane	287-92-3	70	8.54	0.133
C ₆ H ₁₂	Ethylcyclobutane	4806-61-5	84	12.67	0.019
C ₇ H ₁₄	Methylcyclohexane	108-87-2	98	18.10	1.931
<i>Arenes</i>					
C ₆ H ₆	Benzene	71-43-2	78	12.61	0.019
C ₇ H ₈	Toluene	108-88-3	92	17.07	0.032
C ₇ H ₇ F	(Fluoromethyl)benzene	350-50-5	110	20.73	0.008
C ₈ H ₁₀	p-Xylene	106-42-3	106	21.38	0.016
C ₈ H ₁₀	o-Xylene	95-47-6	106	21.12	0.008
C ₈ H ₈	Styrene	100-42-5	104	22.02	0.002
C ₈ H ₁₀	m-Xylene	108-38-3	106	22.03	0.004
C ₈ H ₉ F	p-Fluoroethylbenzene	459-47-2	124	22.18	0.024
C ₈ H ₉ F	3-Fluoro-o-xylene	443-82-3	124	24.28	0.026
C ₉ H ₁₂	Propylbenzene	103-65-1	120	24.93	0.005
C ₉ H ₁₂ O	(Ethoxymethyl)benzene	539-30-0	136	28.69	0.017
C ₁₁ H ₁₆	Pentylbenzene	538-68-1	148	32.09	0.019
C ₁₃ H ₂₀	Heptylbenzene	1078-71-3	176	40.47	0.009
Oxygenated hydrocarbons					
<i>Alcohols</i>					
CH ₄ O	Methanol	67-56-1	32	4.93	0.040
C ₂ H ₆ O	Ethanol	64-17-5	46	6.51	0.014
C ₃ H ₈ O	Isopropyl Alcohol	67-63-0	60	8.06	0.013
C ₄ H ₁₀ O	1-Butanol	71-36-3	74	12.86	0.089
C ₄ H ₁₀ O ₂	1-Methoxy-2-propanol	107-98-2	90	14.30	0.005
C ₆ H ₆ O	Phenol	108-95-2	94	24.76	0.007
C ₇ H ₈ O	2-Methylphenol	95-48-7	108	26.36	0.003
C ₇ H ₈ O	3-Methylphenol	108-39-4	108	26.71	0.003
C ₇ H ₈ O	4-Methylphenol	106-44-5	108	26.91	0.004
C ₉ H ₁₂ O	Benzenepropanol	122-97-4	136	35.57	0.021
C ₁₃ H ₂₈ O	n-Tridecan-1-ol	112-70-9	200	67.13	0.031
<i>Ethers and esters</i>					
C ₆ H ₁₂ O	Tetrahydro-3-methyl-2H-pyran	26093-63-0	100	17.69	0.028
C ₇ H ₁₀ O	1-Methoxy-1,3-cyclohexadiene	2161-90-2	110	23.18	0.018
C ₅ H ₆ O ₂	5,6-Dihydro-2H-pyran-2-one	3393-45-1	98	25.11	0.514

C ₆ H ₁₀ O ₂	γ-Hexalactone	695-06-7	114	27.51	0.003
C ₁₂ H ₂₄ O ₂	Isopropyl ester 3,5,5-trimethylhexanoic acid	(406051)	200	33.64	0.019
C ₈ H ₁₄ O ₂	γ-Octalactone	104-50-7	142	34.59	0.008
C ₁₁ H ₂₀ O ₃	Ethyl ester 2-acetylheptanoic acid	24317-94-0	200	38.73	0.064
C ₉ H ₁₆ O ₂	γ-Nonalactone	104-61-0	156	39.12	0.010
C ₁₃ H ₂₆ O ₂	Butyl ester 3,5,5-trimethylhexanoic acid	(406054)	214	42.78	0.030
C ₁₂ H ₂₆ O ₂	6,8-Doixatetradecane	(334828)	202	45.28	0.095
C ₁₀ H ₁₈ O ₂	γ-Decalactone	706-14-9	170	45.98	0.010
C ₁₃ H ₁₈ O ₂	2-Tert-butyl-4-methylphenol acetate	6950-09-0	206	52.37	0.023
C ₁₂ H ₁₄ O ₄	Diethyl phthalate	84-66-2	222	58.23	0.062
C ₁₂ H ₂₂ O ₂	γ-Dodecalactone	2305-05-7	198	73.95	0.009
C ₁₆ H ₃₂ O ₂	Heptyl ester 3,5,5-trimethylhexanoic acid	(406058)	256	95.55	16.153
C ₁₇ H ₃₄ O ₂	2-Ethylhexyl ester 3,5,5-trimethylhexanoic acid	(406822)	270	100.63	9.450
C ₁₅ H ₂₂ O ₂	Octyl ester benzoic acid	94-50-8	234	127.19	1.411
<i>Aldehydes</i>					
C ₂ H ₄ O	Acetaldehyde	75-07-0	44	5.28	0.060
C ₃ H ₄ O	2-Propenal	107-02-8	56	7.29	0.006
C ₃ H ₆ O	n-Propanal	123-38-6	58	7.48	0.018
C ₄ H ₆ O	2-Methyl-2-propenal	78-85-3	70	9.71	0.004
C ₄ H ₈ O	2-Methylpropanal	78-84-2	72	9.78	0.008
C ₄ H ₈ O	n-Butanal	123-72-8	72	10.57	0.004
C ₅ H ₁₀ O	n-Pentanal	110-62-3	86	14.69	0.005
C ₅ H ₄ O ₂	Furfural	98-01-1	96	17.47	<0.001
C ₅ H ₄ O ₂	3-Furaldehyde	498-60-2	96	18.33	0.005
C ₆ H ₁₂ O	n-Hexanal	66-25-1	100	19.02	0.011
C ₆ H ₁₀ O	2-Methyl-2-pentenal	623-36-9	98	21.25	0.033
C ₇ H ₆ O	Benzaldehyde	100-52-7	106	24.13	0.023
C ₈ H ₁₆ O	2-Ethylhexanal	123-05-7	128	25.63	0.030
C ₈ H ₁₆ O	n-Octanal	124-13-0	128	26.96	0.004
C ₉ H ₁₈ O	n-Nonanal	124-19-6	142	30.49	0.215
C ₉ H ₁₄ O	5-(Methylenecyclopropyl)-pentanal	(158491)	138	31.47	0.329
C ₁₀ H ₂₀ O	n-Decanal	112-31-2	156	33.72	0.099
<i>Ketones</i>					
C ₃ H ₆ O	2-Propanone	67-64-1	58	7.64	0.012
C ₄ H ₆ O	2-Butenone	78-94-4	70	10.34	0.001
C ₄ H ₆ O ₂	2,3-Butanedione	431-03-8	86	10.62	0.014
C ₄ H ₈ O	2-Butanone	78-93-3	72	10.71	0.014
C ₅ H ₁₀ O	2-Pentanone	107-87-9	86	13.71	0.035

C ₆ H ₈ O	3-Methyl-2-cyclopenten-1-one	2758-18-1	96	23.90	0.163
C ₇ H ₁₀ O	2,3-Dimethyl-2-cyclopenten-1-one	1121-05-7	110	26.76	0.016
C ₇ H ₁₀ O	3-Ethyl-2-cyclopenten-1-one	5682-69-9	110	28.04	0.663
C ₇ H ₈ O ₃	3-Hydroxy-2,6-dimethyl-4H-pyran-4-one	2298-99-9	140	32.17	0.333
C ₁₀ H ₂₀ O	2-Decanone	693-54-9	156	33.39	0.023
C ₈ H ₄ O ₃	1,3-Isobenzofurandione	85-44-9	148	35.99	0.182
C ₁₃ H ₂₆ O	3-Tridecanone	1534-26-5	198	51.52	0.011
<i>Carboxylic acids</i>					
C ₂ H ₄ O ₂	Acetic acid	64-19-7	60	11.37	0.089
C ₃ H ₆ O ₂	n-Propanoic acid	79-09-4	74	15.39	0.002
C ₄ H ₈ O ₂	n-Butanoic acid	107-92-6	88	19.08	0.299
C ₅ H ₁₀ O ₂	3-Methylbutanoic acid	503-74-2	102	22.03	0.003
C ₅ H ₁₀ O ₂	n-Pentanoic acid	109-52-4	102	23.00	0.009
C ₆ H ₁₂ O ₂	n-Hexanoic acid	142-62-1	116	26.53	0.059
C ₇ H ₁₄ O ₂	n-Heptanoic acid	111-14-8	130	29.96	0.010
C ₈ H ₁₆ O ₂	n-Octanoic acid	124-07-2	144	32.97	0.123
C ₉ H ₁₈ O ₂	n-Nonanoic acid	112-05-0	158	36.64	0.021
C ₁₀ H ₂₀ O ₂	n-Decanoic acid	334-48-5	172	41.78	0.083
C ₁₂ H ₂₄ O ₂	n-Dodecanoic acid	143-07-7	200	62.28	0.246
C ₁₃ H ₂₆ O ₂	2-Methyldodecanoic acid	2874-74-0	214	68.43	0.009
Heterocyclic compounds					
<i>Furans</i>					
C ₅ H ₆ O	2-Methylfuran	534-22-5	82	10.31	0.002
C ₅ H ₆ O	3-Methylfuran	930-27-8	82	10.57	0.001
C ₆ H ₈ O	2-Ethylfuran	3208-16-0	96	14.50	0.006
C ₉ H ₁₄ O	2-Pentylfuran	3777-69-3	138	26.13	0.006
Nitrogenated compounds					
N ₂	Nitrogen	7727-37-9	28	1.62	0.718
H ₃ N	Ammonia	7664-41-7	17	2.93	0.029
C ₃ H ₅ N	Propargylamine	2450-71-7	55	9.46	0.007
C ₁₂ H ₁₅ NO	5-Ethyl-5-methyl-2-phenyl-2-oxazoline	91875-70-6	189	53.77	0.026
Sulfonated compounds					
H ₂ S	Hydrogen sulfide	7783-06-4	34	3.03	0.001
COS	Carbonyl sulfide	463-58-1	60	3.51	0.002
O ₂ S	Sulfur dioxide	7446-09-5	64	4.70	0.453
CS ₂	Carbon disulfide	75-15-0	76	7.84	0.004
C ₂ H ₆ S ₂	Dimethyl disulfide	624-92-0	94	15.40	<0.001
Inorganic compounds					
<i>Oxides</i>					
CO ₂	Carbon dioxide	124-38-9	44	1.92	0.828

H ₂ O	Water	7732-18-5	18	3.21	60.420
<i>Noble gases</i>					
Ar	Argon	7440-37-1	40	1.57	0.001

Note: ¹CAS/(NIST) – unique numerical identifier of chemical compounds included in the register Chemical Abstracts Service (<https://www.cas.org>) or NIST number (a unique number given to each spectrum in the NIST archive); ²MW – nominal mass; ³RT – retention time; ⁴A – normalized area (the area ratio of the individual gas mixture components to the sum of the areas of all the components in the chromatogram).