

Table S8. Results of GC–MS analysis of volatiles extracted by mechanical shock crushing from quartz (Blagodatnoye deposit, Yenisei ridge).

Formula	Name	¹ CAS	² MW	Quartz 86/241.4	
				³ RT, min	⁴ A, %
Aliphatic hydrocarbons					
Paraffins					
CH4	Methane	74-82-8	16	1.72	3.914
C2H6	Ethane	74-84-0	30	2.48	0.045
C4H10	n-Butane	106-97-8	58	6.16	0.012
C5H12	n-Pentane	109-66-0	72	8.61	0.060
C6H14	n-Hexane	110-54-3	86	12.07	0.011
C7H16	n-Heptane	142-82-5	100	16.12	0.010
C8H18	n-Octane	111-65-9	114	20.20	0.013
C9H20	n-Nonane	111-84-2	128	24.10	0.016
C10H22	n-Decane	124-18-5	142	27.68	0.016
C11H24	n-Undecane	1120-21-4	156	31.01	0.012
C12H26	n-Dodecane	112-40-3	170	34.12	0.009
C13H28	n-Tridecane	629-50-5	184	38.15	0.014
C14H30	n-Tetradecane	629-59-4	198	44.25	0.014
C15H32	n-Pentadecane	629-62-9	212	53.81	0.016
C17H36	n-Heptadecane	629-78-7	240	109.86	0.737
Olefins					
C2H4	Ethylene	74-85-1	28	2.18	0.006
C4H8	2-Methyl-1-propene	115-11-7	56	5.95	0.011
C5H10	1-Pentene	109-67-1	70	8.31	0.001
C5H8	1,3-Pentadiene	1574-41-0	68	8.58	0.007
C5H8	(E)-1,3-Pentadiene	2004-70-8	68	8.79	<0.001
C5H8	(Z)-1,3-Pentadiene	1574-41-0	68	8.86	<0.001
C6H12	1-Hexene	592-41-6	84	11.72	0.010
C7H14	1-Heptene	592-76-7	98	15.75	0.058
C8H16	1-Octene	111-66-0	112	19.87	0.005
C9H18	1-Nonene	124-11-8	126	23.81	0.005
C10H20	1-Decene	872-05-9	140	27.44	0.006
C11H22	1-Undecene	821-95-4	154	30.51	0.005
C13H26	1-Tridecene	2437-56-1	182	37.90	0.013
C14H28	1-Tetradecene	1120-36-1	196	43.85	0.016
C15H30	1-Pentadecene	13360-61-7	210	53.22	0.033
Cyclic hydrocarbons					
Cycloalkanes (naphthenes) and cycloalkenes					
C5H8	Cyclopentene	142-29-0	68	9.06	<0.001
Arenes					
C6H6	Benzene	71-43-2	78	12.61	0.019
C7H8	Toluene	108-88-3	92	17.07	0.005
C7H7F	(Fluoromethyl)benzene	350-50-5	110	20.75	<0.001
C8H10	Ethylbenzene	100-41-4	106	21.13	0.004

C ₈ H ₁₀	p-Xylene	106-42-3	106	21.40	0.007
C ₈ H ₁₀	o-Xylene	95-47-6	106	21.70	0.003
C ₈ H ₁₀	m-Xylene	108-38-3	106	22.03	0.004
C ₈ H ₈	Styrene	100-42-5	104	22.05	0.002
C ₉ H ₁₂	Propylbenzene	103-65-1	120	24.96	0.009
C ₁₀ H ₁₄	Butylbenzene	104-51-8	134	28.73	0.029
C ₁₁ H ₁₆	Pentylbenzene	538-68-1	148	32.12	0.027
C ₁₂ H ₁₈	Hexylbenzene	1077-16-3	162	35.55	0.020
C ₁₃ H ₂₀	Heptylbenzene	1078-71-3	176	40.50	0.017
C ₁₄ H ₂₂	Octylbenzene	2189-60-8	190	48.08	0.018
Oxygenated hydrocarbons					
<i>Alcohols</i>					
CH ₄ O	Methanol	67-56-1	32	4.61	0.221
C ₂ H ₆ O	Ethanol	64-17-5	46	6.41	0.033
C ₃ H ₆ O	2-Propen-1-ol	107-18-6	58	8.86	0.005
C ₄ H ₁₀ O	1-Butanol	71-36-3	74	12.97	0.017
C ₆ H ₆ O	Phenol	108-95-2	94	24.78	0.008
C ₆ H ₅ FS	4-Fluorothiophenol	371-42-6	128	28.33	0.004
<i>Ethers and esters</i>					
C ₅ H ₈ O ₂	Methyl methacrylate	80-62-6	100	14.52	0.003
C ₄ H ₆ O ₂	Butyrolactone	96-48-0	86	20.97	0.002
C ₈ H ₁₄ O ₂	γ-Octalactone	104-50-7	142	34.62	0.008
C ₉ H ₁₆ O ₂	γ-Nonalactone	104-61-0	156	39.15	0.004
C ₁₀ H ₁₈ O ₂	γ-Decalactone	706-14-9	170	46.06	0.014
C ₁₂ H ₂₂ O ₂	γ-Dodecalactone	2305-05-7	198	74.12	0.034
C ₁₂ H ₁₄ O ₄	Diethyl phthalate	84-66-2	222	71.26	0.445
C ₁₆ H ₂₂ O ₄	Diisobutyl phthalate	84-69-5	278	113.75	0.213
<i>Aldehydes</i>					
C ₂ H ₄ O	Acetaldehyde	75-07-0	44	5.30	0.107
C ₃ H ₄ O	2-Propenal	107-02-8	56	7.28	0.011
C ₃ H ₆ O	n-Propanal	123-38-6	58	7.48	0.003
C ₄ H ₆ O	2-Methyl-2-propenal	78-85-3	70	9.73	0.001
C ₄ H ₈ O	2-Methylpropanal	78-84-2	72	9.78	0.001
C ₄ H ₈ O	n-Butanal	123-72-8	72	10.56	0.001
C ₅ H ₈ O	2-Methyl-2-butenal	1115-11-3	84	13.47	<0.001
C ₅ H ₁₀ O	3-Methylbutanal	590-86-3	86	13.76	0.005
C ₅ H ₁₀ O	n-Pentanal	110-62-3	86	14.72	0.003
C ₅ H ₄ O ₂	Furfural	98-01-1	96	17.50	0.001
C ₆ H ₁₀ O	2-Methyl-2-pentenal	623-36-9	98	18.15	<0.001
C ₅ H ₄ O ₂	3-Furaldehyde	498-60-2	96	18.37	0.014
C ₆ H ₁₂ O	n-Hexanal	66-25-1	100	19.07	0.016
C ₇ H ₁₄ O	n-Heptanal	111-71-7	114	23.18	0.011
C ₆ H ₆ O ₂	5-Methyl-2-furancarboxaldehyde	620-02-0	110	23.40	0.002
C ₇ H ₆ O	Benzaldehyde	100-52-7	106	24.15	0.021

C ₈ H ₁₆ O	2-Ethylhexanal	123-05-7	128	25.66	0.005
C ₈ H ₁₆ O	n-Octanal	124-13-0	128	26.99	0.017
C ₉ H ₁₈ O	n-Nonanal	124-19-6	142	30.51	0.026
C ₁₀ H ₂₀ O	n-Decanal	112-31-2	156	33.74	0.033
C ₁₁ H ₂₂ O	n-Undecanal	112-44-7	170	37.72	0.016
C ₁₂ H ₂₄ O	n-Dodecanal	112-54-9	184	43.65	0.016
C ₁₃ H ₂₆ O	n-Tridecanal	10486-19-8	198	52.92	0.016
C ₁₄ H ₂₈ O	n-Tetradecanal	124-25-4	212	67.63	0.033
C ₁₅ H ₃₀ O	n-Pentadecanal	2765-11-9	226	91.67	0.067
<i>Ketones</i>					
C ₃ H ₆ O	2-Propanone	67-64-1	58	7.66	0.037
C ₄ H ₆ O ₂	2,3-Butanedione	431-03-8	86	10.66	0.001
C ₄ H ₈ O	2-Butanone	78-93-3	72	10.72	0.002
C ₅ H ₈ O	Cyclopentanone	120-92-3	84	16.95	0.003
C ₆ H ₁₂ O	2-Hexanone	591-78-6	100	18.80	0.003
C ₇ H ₁₄ O	2-Heptanone	110-43-0	114	22.90	0.005
C ₈ H ₁₆ O	2-Octanone	111-13-7	128	25.90	0.005
C ₉ H ₁₈ O	2-Nonanone	821-55-6	142	30.19	0.008
C ₁₀ H ₂₀ O	2-Decanone	693-54-9	156	33.41	0.008
C ₈ H ₄ O ₃	1,3-Isobenzofurandione	85-44-9	148	36.04	0.058
C ₁₁ H ₂₂ O	2-Undecanone	53452-70-3	170	37.19	0.020
C ₁₂ H ₂₄ O	2-Dodecanone	6175-49-1	184	42.83	0.009
C ₁₃ H ₂₆ O	2-Tridecanone	593-08-8	198	51.57	0.023
C ₁₄ H ₂₈ O	2-Tetradecanone	2345-27-9	212	65.35	0.027
C ₁₅ H ₃₀ O	2-Pentadecanone	2345-28-0	226	87.91	0.066
<i>Carboxylic acids</i>					
C ₂ H ₄ O ₂	Acetic acid	64-19-7	60	11.37	0.155
C ₃ H ₆ O ₂	n-Propanoic acid	79-09-4	74	15.39	0.004
C ₄ H ₈ O ₂	n-Butanoic acid	107-92-6	88	19.02	0.110
C ₅ H ₁₀ O ₂	3-Methylbutanoic acid	503-74-2	102	22.15	0.010
C ₅ H ₁₀ O ₂	n-Pentanoic acid	109-52-4	102	23.06	0.019
C ₆ H ₁₂ O ₂	n-Hexanoic acid	142-62-1	116	26.55	0.119
C ₇ H ₁₄ O ₂	n-Heptanoic acid	111-14-8	130	30.01	0.023
C ₈ H ₁₆ O ₂	n-Octanoic acid	124-07-2	144	32.99	0.292
C ₉ H ₁₈ O ₂	n-Nonanoic acid	112-05-0	158	36.72	0.039
C ₁₀ H ₂₀ O ₂	n-Decanoic acid	334-48-5	172	41.77	0.120
C ₁₂ H ₂₄ O ₂	n-Dodecanoic acid	143-07-7	200	62.53	0.176
C ₁₄ H ₂₈ O ₂	n-Tetradecanoic acid	544-63-8	228	118.55	0.102
Heterocyclic compounds					
<i>Furans</i>					
C ₅ H ₆ O	2-Methylfuran	534-22-5	82	10.33	0.001
C ₆ H ₈ O	2-Ethylfuran	3208-16-0	96	15.05	0.001
C ₇ H ₁₀ O	2-Propylfuran	4229-91-8	110	18.25	0.001
C ₈ H ₁₂ O	2-Butylfuran	4466-24-4	124	22.33	0.002

C ₉ H ₁₄ O	2-Pentylfuran	3777-69-3	138	26.16	0.002
Nitrogenated compounds					
N ₂	Nitrogen	7727-37-9	28	1.62	2.102
C ₂ H ₃ N	Acetonitrile	75-05-8	41	6.89	0.012
C ₂ H ₅ NO	Acetamide	60-35-5	59	16.09	0.014
C ₆ H ₈ N ₂ O	2-Methoxy-6-methyl-pyrazine	2882-21-5	124	27.81	0.022
C ₄ H ₅ NO ₂	Succinimide	123-56-8	99	28.89	0.008
C ₇ H ₁₅ NO	Heptanamide	628-62-6	129	31.12	0.003
C ₉ H ₁₉ NO	Nonanamide	1120-07-6	157	38.83	0.007
C ₁₀ H ₂₁ NO	Decanamide	2319-29-1	171	55.74	0.008
C ₁₃ H ₂₇ NO	Tridecanamide	34778-57-9	213	98.60	0.014
Sulfonated compounds					
H ₂ S	Hydrogen sulfide	7783-06-4	34	2.88	0.001
COS	Carbonyl sulfide	463-58-1	60	3.53	0.004
O ₂ S	Sulfur dioxide	7446-09-5	64	4.46	0.161
CH ₄ S	Methanethiol	74-93-1	48	5.56	0.016
CS ₂	Carbon disulfide	75-15-0	76	7.88	0.006
C ₄ H ₄ S	Thiophene	110-02-1	84	12.36	<0.001
C ₂ H ₆ S ₂	Dimethyl disulfide	624-92-0	94	15.44	<0.001
C ₆ H ₅ FS	4-Fluorothiophenol	371-42-6	128	28.33	0.004
Inorganic compounds					
<i>Oxides</i>					
CO ₂	Carbon dioxide	124-38-9	44	1.92	9.470
H ₂ O	Water	7732-18-5	18	3.20	80.020
<i>Noble gases</i>					
Ar	Argon	7440-37-1	40	1.58	0.002

Note: ¹CAS – unique numerical identifier of chemical compounds included in the register Chemical Abstracts Service (<https://www.cas.org>); 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).