A step towards the molecular detection of life on Mars

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Supplementary material

Supplementary Table 1 (Chapter 4). Position of minerals in incubator with respective chemical formulae. Except for quartz minerals in chambers 1, 8 and 16 (position controls), all other minerals were distributed at random.

Chambers	Minerals	Chemical formula
1	Quartz.1A Quartz.1B Quartz.1C	SiO_2 SiO_2 SiO_2
2	Goethite.2 Diopside.2 Magnetite.2	FeO(OH) $CaMgSi_2O_6$, Fe_3O_4
3	Fluorapatite.3 Diopside.3 Goethite.3	$Ca_5(PO_4)_3F$ $CaMgSi_2O_6$, FeO(OH)
4	Labradorite.4 Jarosite.4 Quartz.4	$(Ca,Na)(Al,Si)_4O_8$ $KFe_3(SO_4)_2(OH)_6$ SiO_2
5	Magnetite.5 Forsterite.5 Fluorapatite.5	Fe_3O_4 Mg_2SiO_4 $Ca_5(PO_4)_3F$
6	Fluorapatite.6 Forsterite.6 Montmorillonite.6	$Ca_5(PO_4)_3F$ Mg_2SiO_4 $(Na,Ca)_{0.33}(Al,Mg)_2(Si_4O_{10})(OH)2\cdot nH_2O$
7	Kaolinite.7 Hematite.7 Montmorillonite.7	$Al_2Si_2O_5(OH)_4$ Fe_2O_3 $(Na,Ca)_{0.33}(Al,Mg)_2(Si_4O_{10})(OH)2\cdot nH_2O$
8	Quartz.8A Quartz.8B Quartz.8C	SiO_2 SiO_2 SiO_2
9	Orthoclase.9 Quartz.9 Hematite.9	$(K,Na)AlSi_3O_8$ SiO_2 Fe_2O_3
10	Kaolinite.10 Magnetite.10 Diopside.10	$Al_2Si_2O_5(OH)_4$ Fe_3O_4 $CaMgSi_2O_6$,
11	Forsterite.11 Jarosite.11 Orthoclase.11	Mg_2SiO_4 $KFe_3(SO_4)_2(OH)_6$ $(K,Na)AlSi_3O_8$
12	Nontronite.12B Quartz.12 Nontronite.12A	$(CaO_{0.5},Na)_{0.3}Fe^{3+}_2(Si,Al)_4O_{10}(OH)_2\cdot nH_2O$ SiO_2 $(CaO_{0.5},Na)_{0.3}Fe^{3+}_2(Si,Al)_4O_{10}(OH)_2\cdot nH_2O$
13	Labradorite.13 Jarosite.13 Hematite.13	$(Ca,Na)(Al,Si)_4O_8$ $KFe_3(SO_4)_2(OH)_6$ Fe_2O_3
14	Montmorillonite.14 Orthoclase.14 Kaolinite.14	$(Na,Ca)_{0.33}(Al,Mg)_2(Si_4O_{10})(OH)2\cdot nH_2O$ $(K,Na)AlSi_3O_8$ $Al_2Si_2O_5(OH)_4$
15	Goethite.15 Labradorite.15 Nontronite.15	FeO(OH) $(Ca,Na)(Al,Si)_4O_8$ $(CaO_{0.5},Na)_{0.3}Fe^{3+}_2(Si,Al)_4O_{10}(OH)_2\cdot nH_2O$
16	Quartz.16A Quartz.16B Quartz.16C	SiO_2 SiO_2 SiO_2

Supplementary Table 2 (Chapter 4). Significance of mineral-specific absence of OTUs. OTUs Ids, taxa names, *p* values, minerals in which OTUs were absent, and average abundances (%) over all minerals with standard deviation (SD). False Discovery Rate (FDR) was 5% ($p \leq 0.05$). *non-significant *p* value.

OTU ID	Taxon	*p* value	Absent in mineral	Abundance (%)	SD (%)
231	*Methylobacter*	$7.0 \cdot 10^{-36}$	Kaolinite	3.2	3.2
42	*Desulfobacca*	$1.4 \cdot 10^{-6}$ $1.3 \cdot 10^{-9}$	Diopside Kaolinite	0.8	1.3
74558	*Rikenella*	$6.6 \cdot 10^{-13}$	Goethite	0.6	0.8
36239	*Meniscus*	$2.8 \cdot 10^{-12}$	Goethite	0.6	0.9
338	*Bacteroidetes*	$3.4 \cdot 10^{-8}$	Goethite	0.4	0.4
40934	*Delftia*	$2.9 \cdot 10^{-3}$ $1.4 \cdot 10^{-4}$	Diopside Kaolinite	0.3	0.7
87302	*Geobacter*	$8.7 \cdot 10^{-3}$	Diopside	0.3	0.7
76213	*Desulfurivibrio*	$1.1 \cdot 10^{-3}$ $1.1 \cdot 10^{-2}$ $5.5 \cdot 10^{-13}$ $1.3 \cdot 10^{-2}$	Kaolinite Diopside Orthoclase Fluorapatite	0.3	0.7
31805	*Acidaminobacter*	$2.2 \cdot 10^{-3}$	Kaolinite	0.2	0.3
90753	*Sedimentibacter*	$4.7 \cdot 10^{-8}$ $4.4 \cdot 10^{-3}$ $5.9 \cdot 10^{-17}$	Orthoclase Kaolinite Magnetite	0.2	1.0
93526	*Saccharofermentans*	$44 \cdot 10^{-3}$	Kaolinite	0.2	0.3
65194	*Bacteroidetes*	$5.1 \cdot 10^{-3}$	Kaolinite	0.2	0.3
16	*Rhodocyclaceae*	$5.3 \cdot 10^{-3}$ $1.0 \cdot 10^{-6}$ $3.7 \cdot 10^{-10}$	Kaolinite Labradorite Orthoclase	0.2	0.4
250	OD1 *incertae sedis*	$4.7 \cdot 10^{-5}$	Goethite	0.2	0.6
41059	*Undibacterium*	$3.8 \cdot 10^{-2}$ $4.3 \cdot 10^{-2}$ $2.2 \cdot 10^{-87}$	Diopside Fluorapatite Quartz	0.2	0.4
56403	*Thiobacillus*	$1.1 \cdot 10^{-4}$ $1.5 \cdot 10^{-6}$ $8.4 \cdot 10^{-3}$ $5.4 \cdot 10^{-15}$	Goethite Hematite Kaolinite Magnetite	0.2	1.0
77200	*Modestobacter*	$5.4 \cdot 10^{-2}$ $8.5 \cdot 10^{-8}$ $1.6 \cdot 10^{-4}$ $5.5 \cdot 10^{-6}$ $6.0 \cdot 10^{-88}$	Fluorapatite Forsterite Goethite Labradorite Quartz	0.2	0.5
15214	*Coriobacteriaceae*	$5.2 \cdot 10^{-2}$ $1.1 \cdot 10^{-2}$	Diopside Kaolinite	0.2	0.4
66493	*Geobacter*	$5.4 \cdot 10^{-2}$ $1.2 \cdot 10^{-2}$ $*6.0 \cdot 10^{-2}$ $8.4 \cdot 10^{-6}$	Diopside Kaolinite Fluorapatite Labradorite	0.2	0.3
189	*Gordonibacter*	$6.8 \cdot 10^{-6}$ $1.4 \cdot 10^{-2}$ $2.1 \cdot 10^{-13}$ $2.4 \cdot 10^{-8}$ $1.3 \cdot 10^{-88}$	Hematite Kaolinite Magnetite Orthoclase Quartz	0.2	0.5
25180	*Clostridium*	$1.4E^{-2}$ $*6.8 \cdot 10^{-2}$	Kaolinite Fluorapatite	0.2	0.6
46685	*Ignavibacterium*	$*6.9 \cdot 10^{-2}$ $2.3 \cdot 10^{-5}$	Diopside Labradorite	0.2	0.4
243	*Leptotrichia*	$*7.2 \cdot 10^{-2}$ $2.7 \cdot 10^{-5}$	Diopside Labradorite	0.2	0.3