Supporting Information

Electrochemical survey of electroactive microbial populations in deep-sea hydrothermal fields

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Table S1 – S2.
Figure S1 – S6.

Table S1. Dive summary

Dive no.	Date	Location*	Rock sample
KK#804	05-Nov-2018	Field A	A1, A2
KK#805	06-Nov-2018	Field A	A3, A4
KK#806	07-Nov-2018	Field B	No sample
KK#807	08-Nov-2018	Field B	B1, B2, B3. B4
KK#808	10-Nov-2018	Field C	No sample
KK#809	11-Nov-2018	Field C	C1, C2, C3, C4, C5, C6
KK#810	12-Nov-2018	Field A	A5, A6, A7

* Field A: Original site, Iheya North field; Field B: JADE site, Izena Hole field; Field C: Ieyama field

Table S2. Constituent minerals detected in the rock samples via XRD analysis

	Sphalerite (ZnS)	Wurtzite (ZnS)	Galena (PbS)	Pyrite (FeS_2)	Chalcopyrite ($CuFeS_2$)	Covellite (CuS)	Angresite ($PbSO_4$)	Barite ($BaSO_4$)	Quartz (SiO_2)
A1	+	+	+	+	+				
A2	+	+	+	+	+				
A3									+
A4	+			+	+		+		
A5	+			+	+		+		
A6	+		+	+	+		+		
A7	+	+		+	+		+		
B1								+	
B2								+	
B3								+	
B4						+		+	
C1	+		+						
C2	+		+						
C3	+		+		+				
C4	+		+					+	
C5	+		+						
C6	+		+						

+: detected via XRD analysis

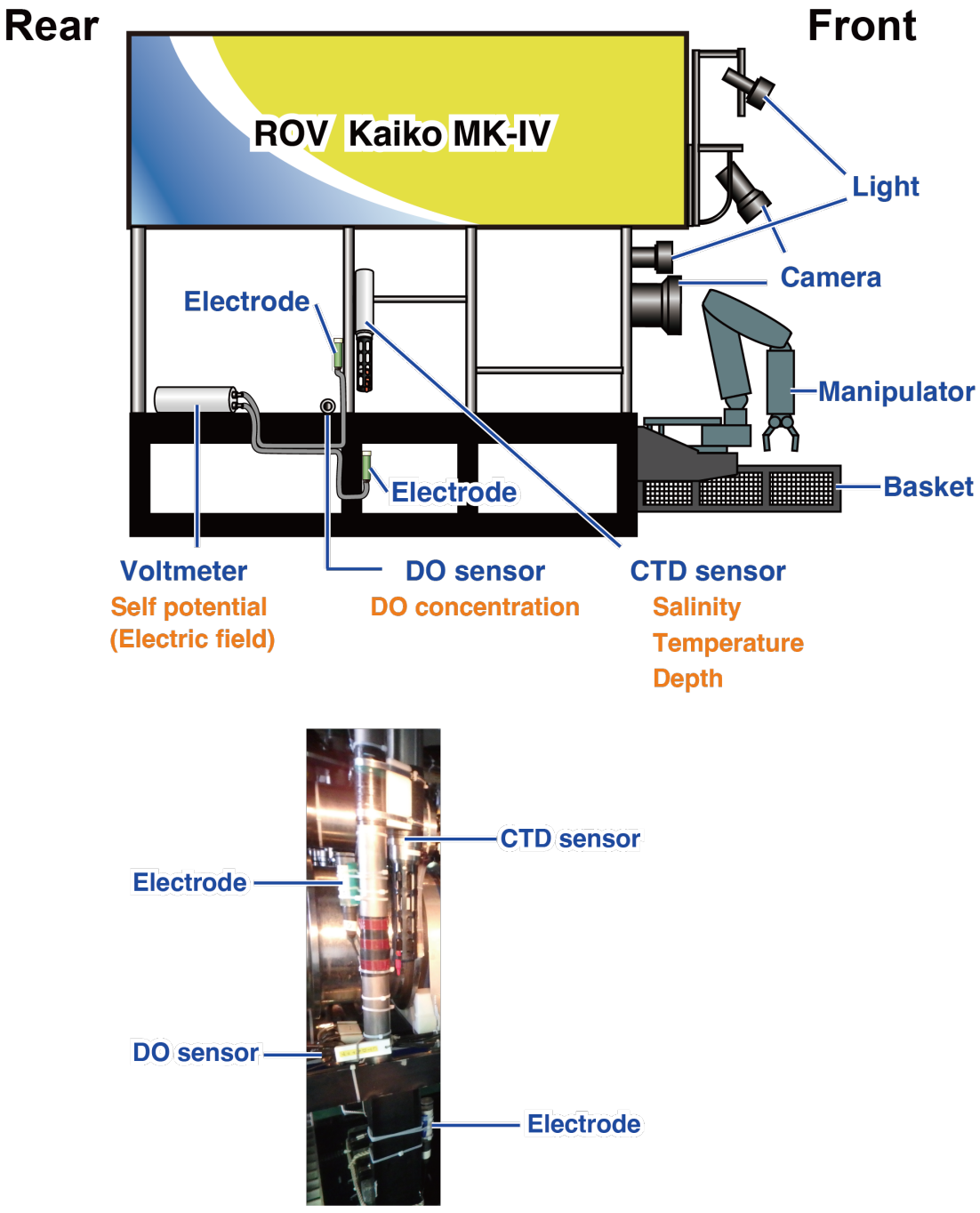


Figure S1.

The measurement and operating apparatuses equipped on the ROV.

The measuring apparatuses (voltmeter with electrodes, CTD sensor, and DO sensor) were installed on the starboard of the ROV.

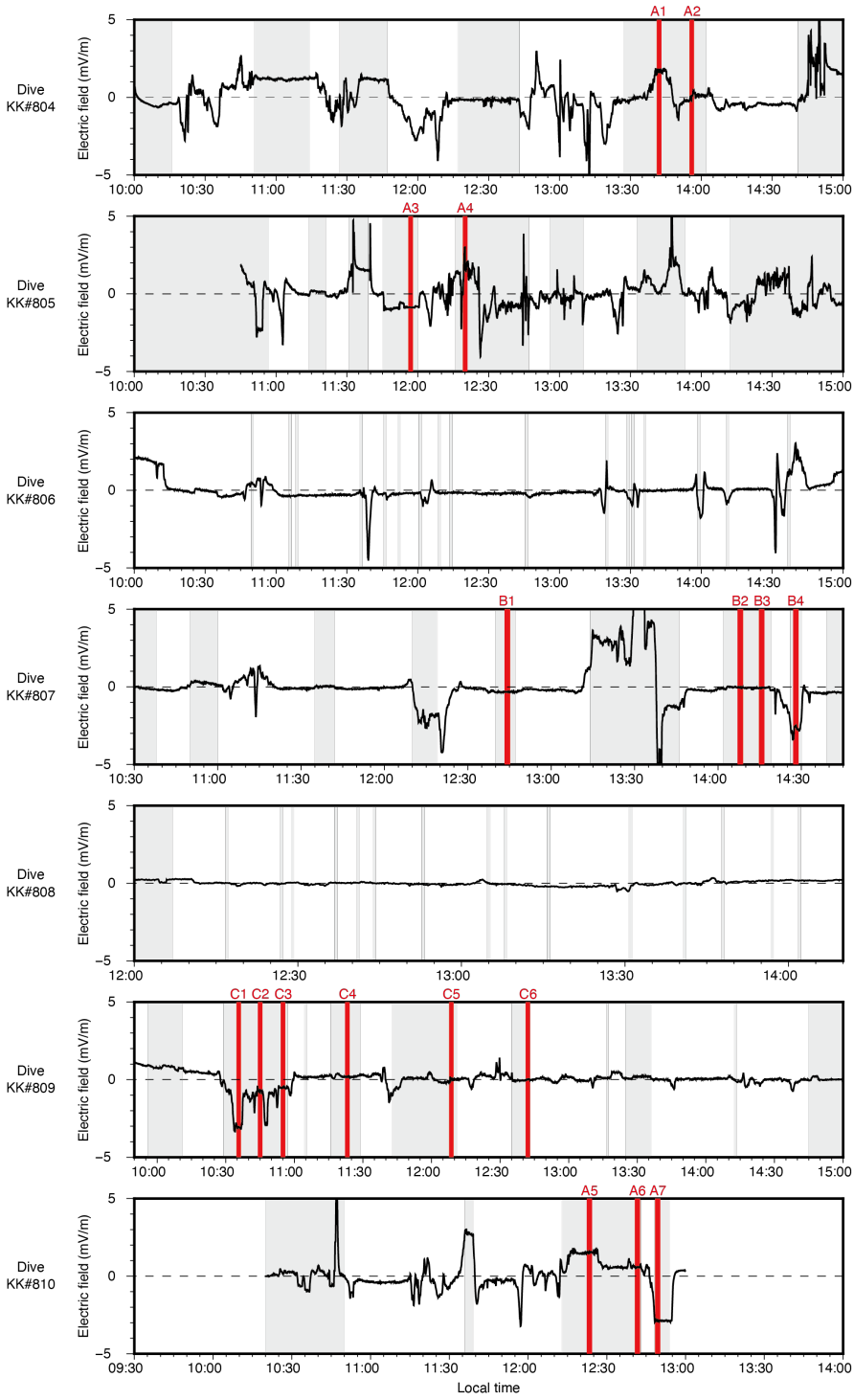


Figure S2.

Time course of electric field during seven dives.

Red bar indicates the 2 minutes included during the rock sampling, which was used to determine the electric field at the rock location. Gray background indicates the ime period when the ROV is landing on the seafloor.

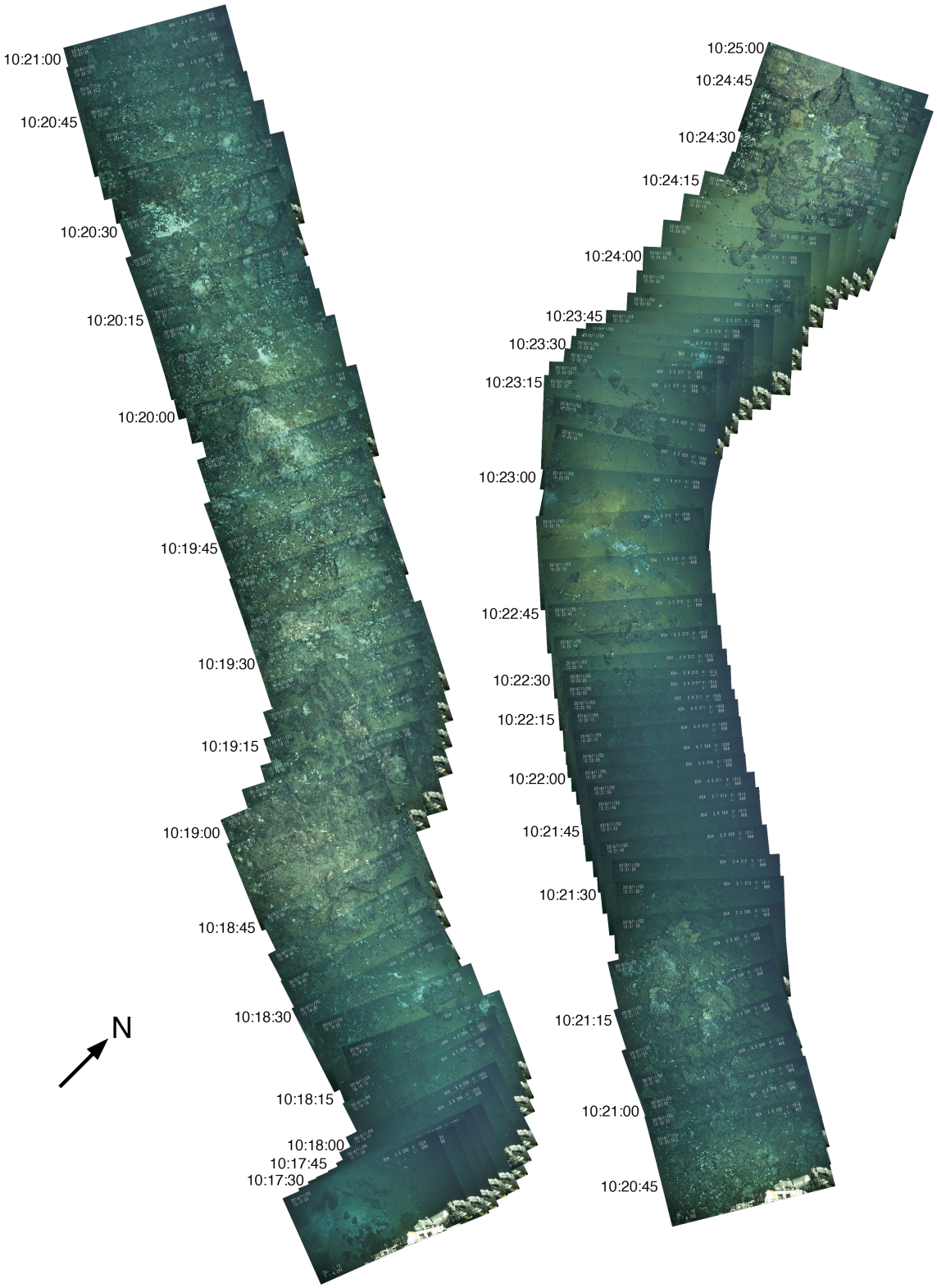


Figure S3.

Photo mosaic of seafloor.

The Photos were taken from the ROV between 10:17:20 to10:25:00 during the dive KK804.

(A)

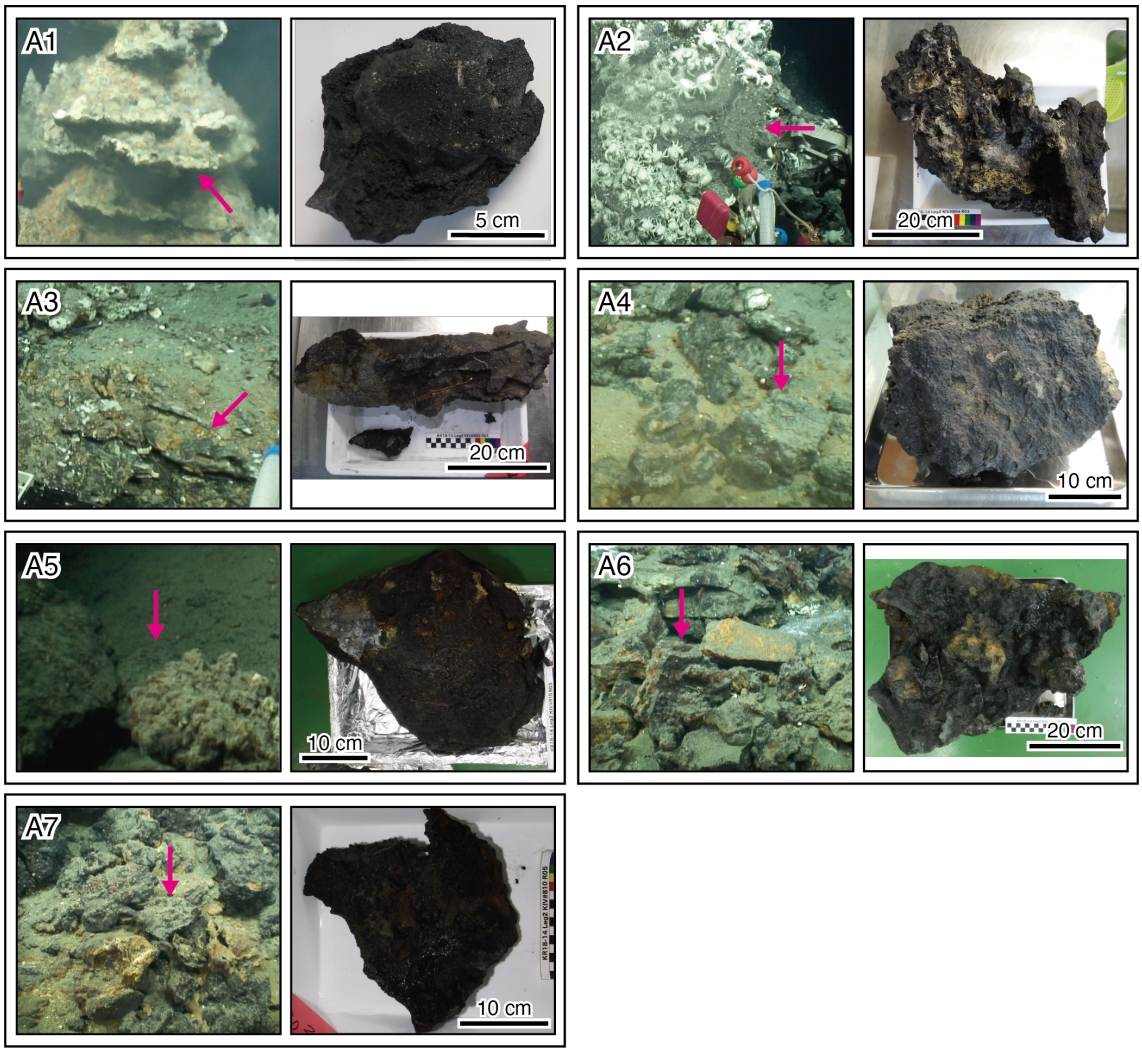


Figure S4 (A).

Photo images of rock samples collected from Site A.

The left photo was taken at the seafloor just before rock sampling. The magenta arrow indicates the position of the rock sample. The right image was taken onboard the ship.

(B)

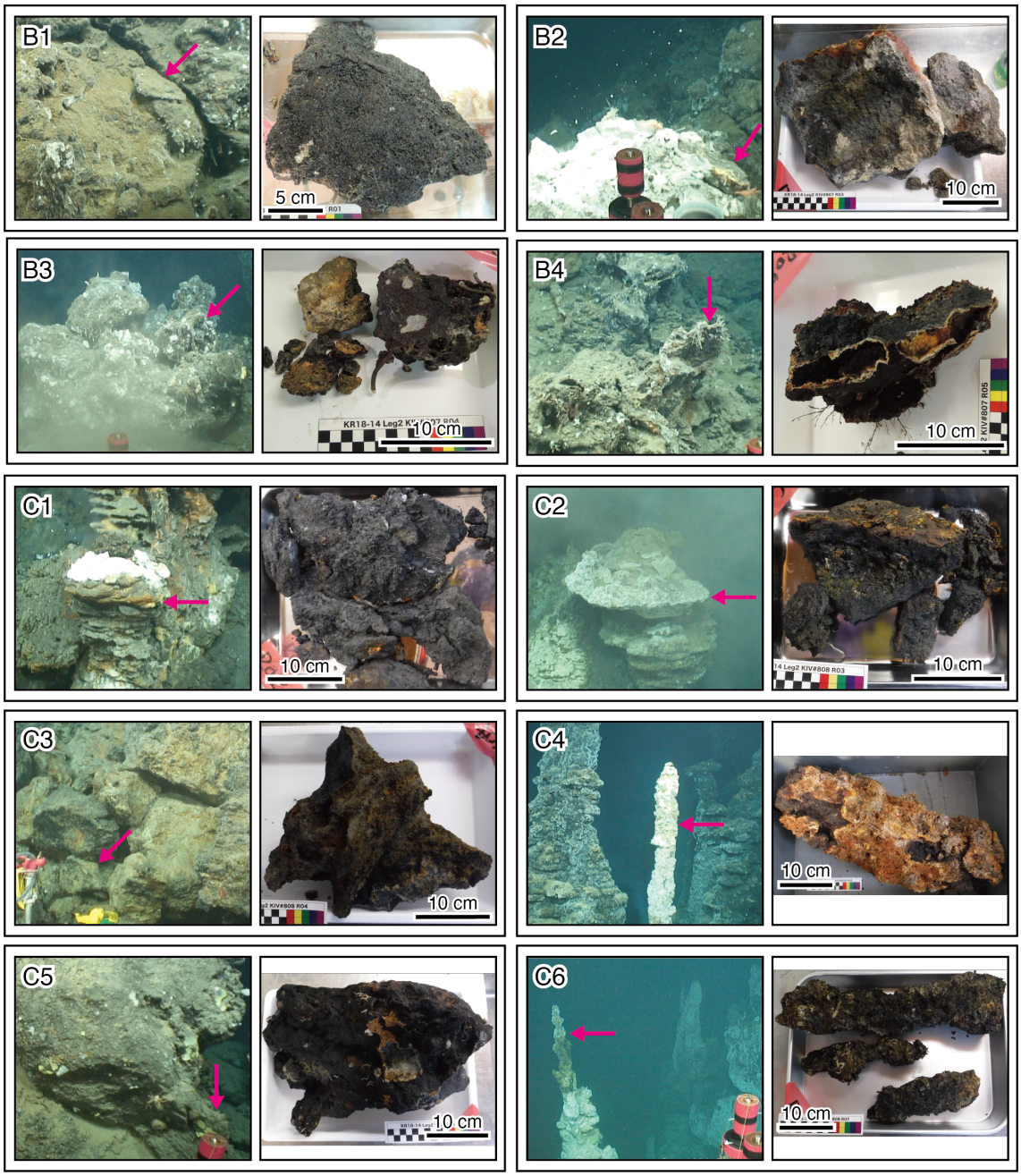


Figure S4 (B).

Photo images of rock samples collected from Site B and Site C.

The left photo was taken at the seafloor just before rock sampling. The magenta arrow indicates the position of the rock sample. The right image was taken onboard the ship.

Figure S5 (A)

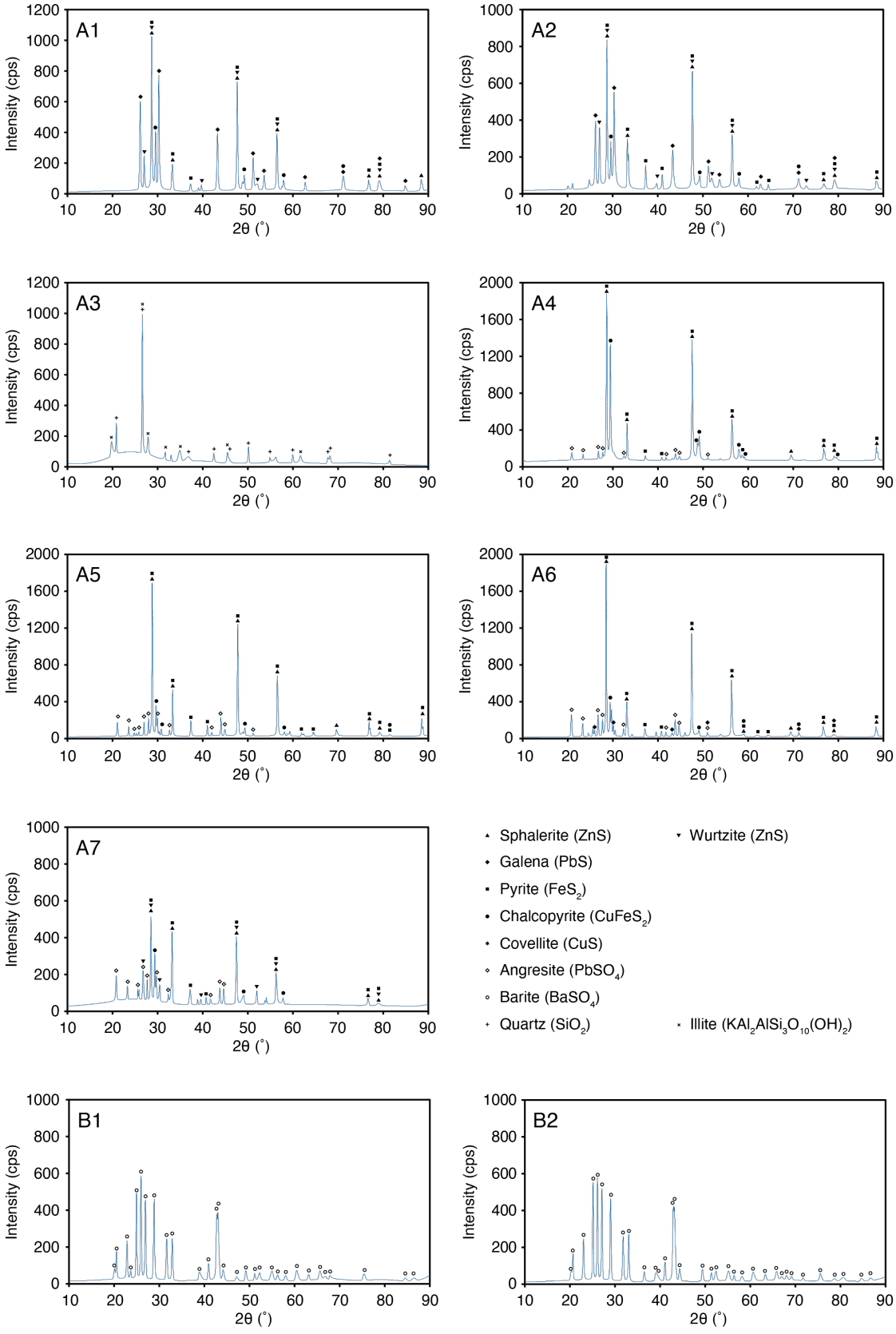

A1
A2
A3
A4
A5
A6
A7
B1
B2
Intensity (cps)
2θ (˚)
Sphalerite (ZnS)
Wurtzite (ZnS)
Galena (PbS)
Pyrite (FeS_2)
Chalcopyrite ($CuFeS_2$)
Covellite (CuS)
Angresite ($PbSO_4$)
Barite ($BaSO_4$)
Quartz (SiO_2)
Illite ($KAl_2AlSi_3O_{10}(OH)_2$)

Figure S5 (B)

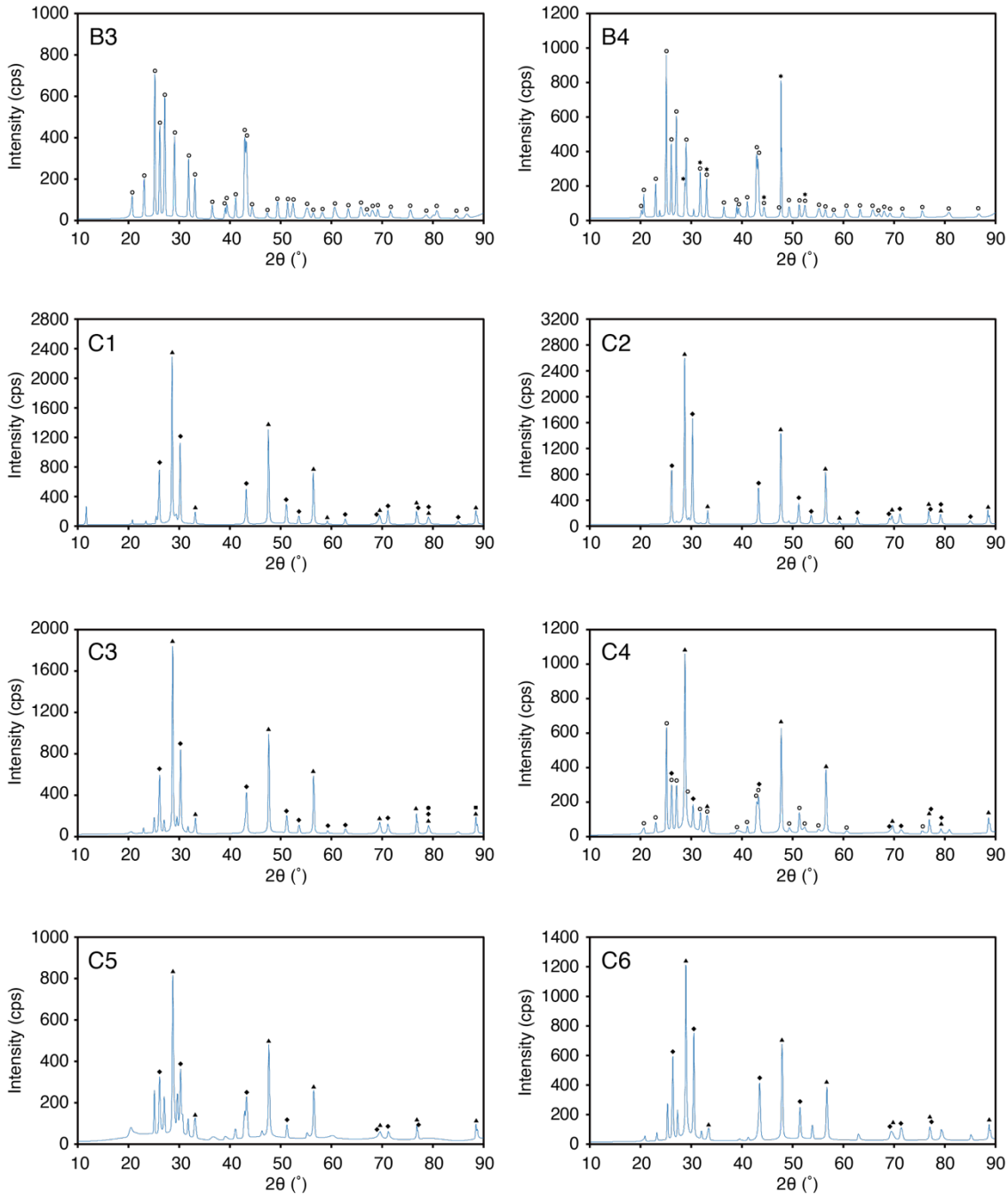


Figure S5

XRD analysis of rock samples.

(A) Samples A1-A4 and B1-B2.

(B) Samples B3-B4 and C1-C6.

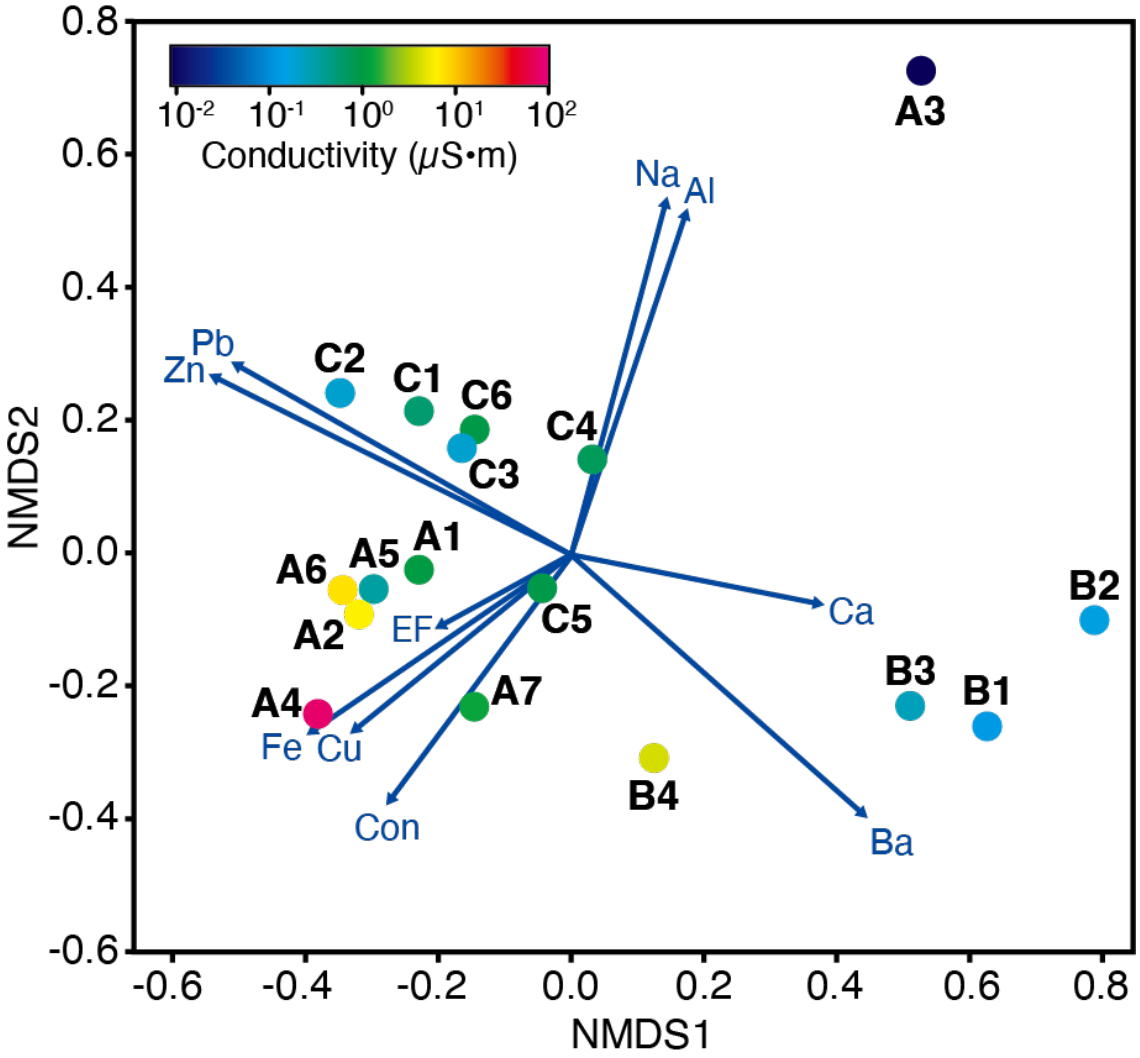


Figure S6.

NMDS analysis of the elemental composition of rock samples.

The 17 rock samples are plotted with circles. The color in the circle indicates the conductivity of the rock sample. The overlaid vectors of the elements, electric field (EF), and conductivity of the rock (Con) indicate the direction and correlation of the variables with respect to the rock samples.