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Electronic Supporting Information

Effects of synthetic iron and aluminum oxide surface charge and hydrophobicity on the formation of bacterial biofilm

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Summary

- **Number of pages: 17**
- **Number of Figures: 15**
- **Number of Tables: 1**

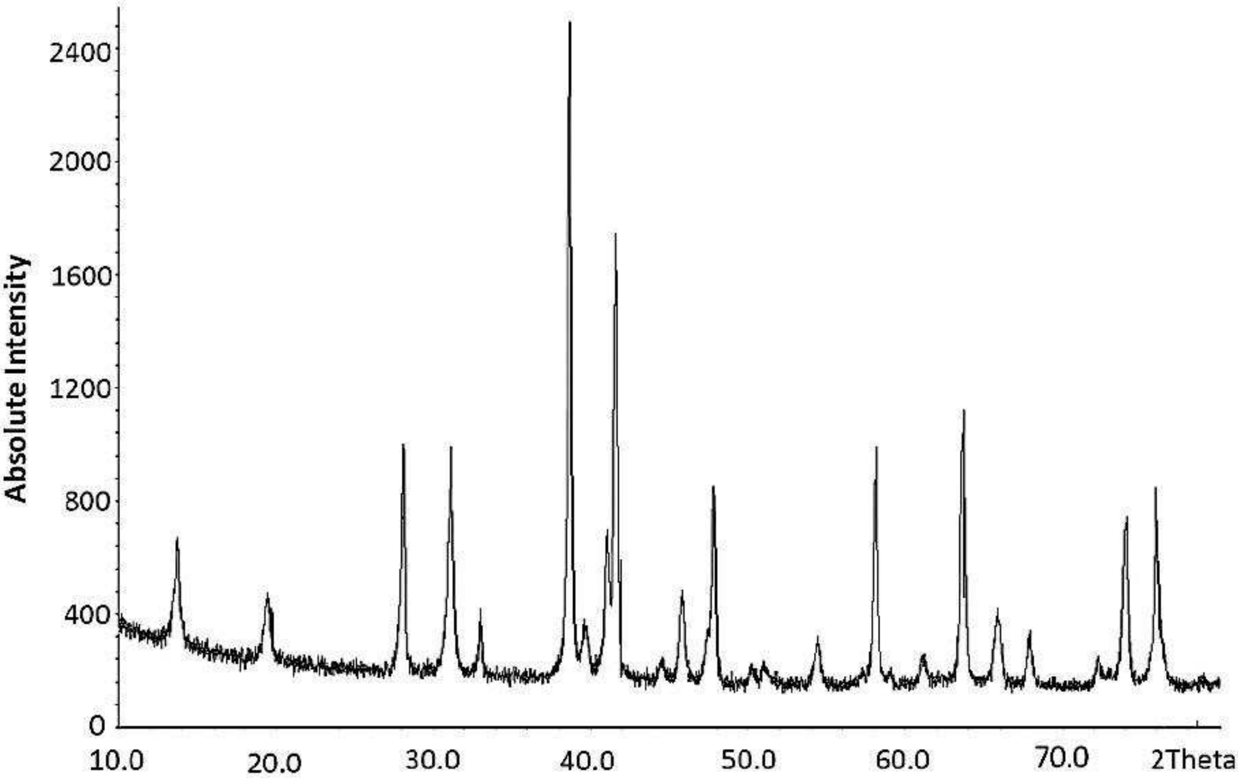

Figure S1. The XRD graph of the synthetic hematite.

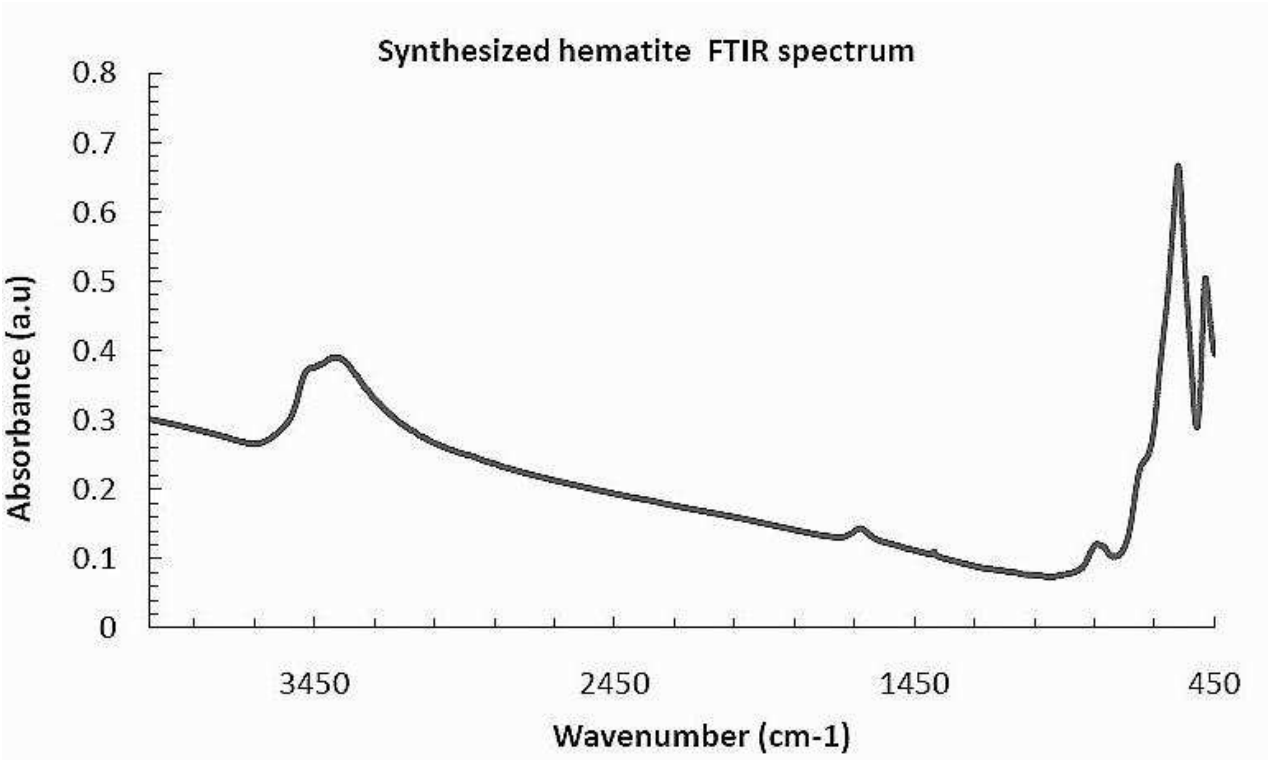

Figure S2. The FTIR spectrum for the synthetic hematite.

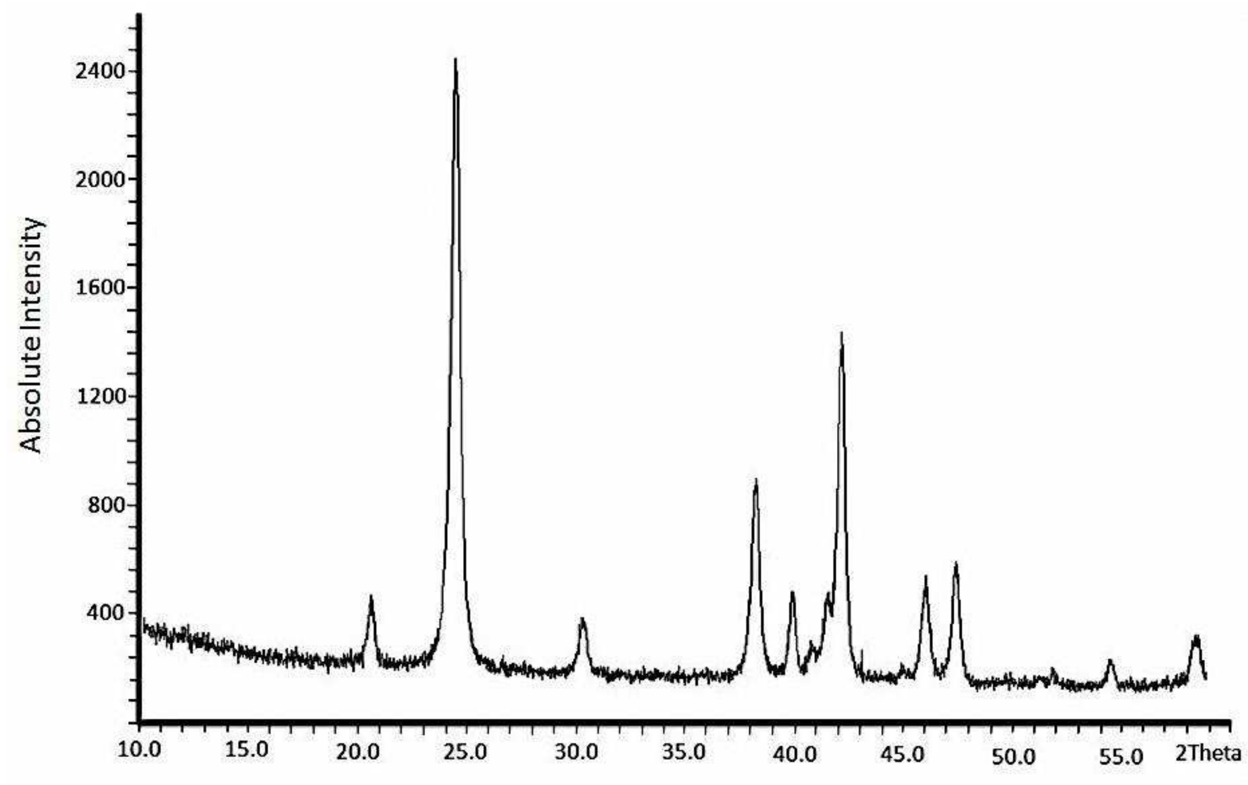

Figure S3. The XRD graph of the synthetic goethite.

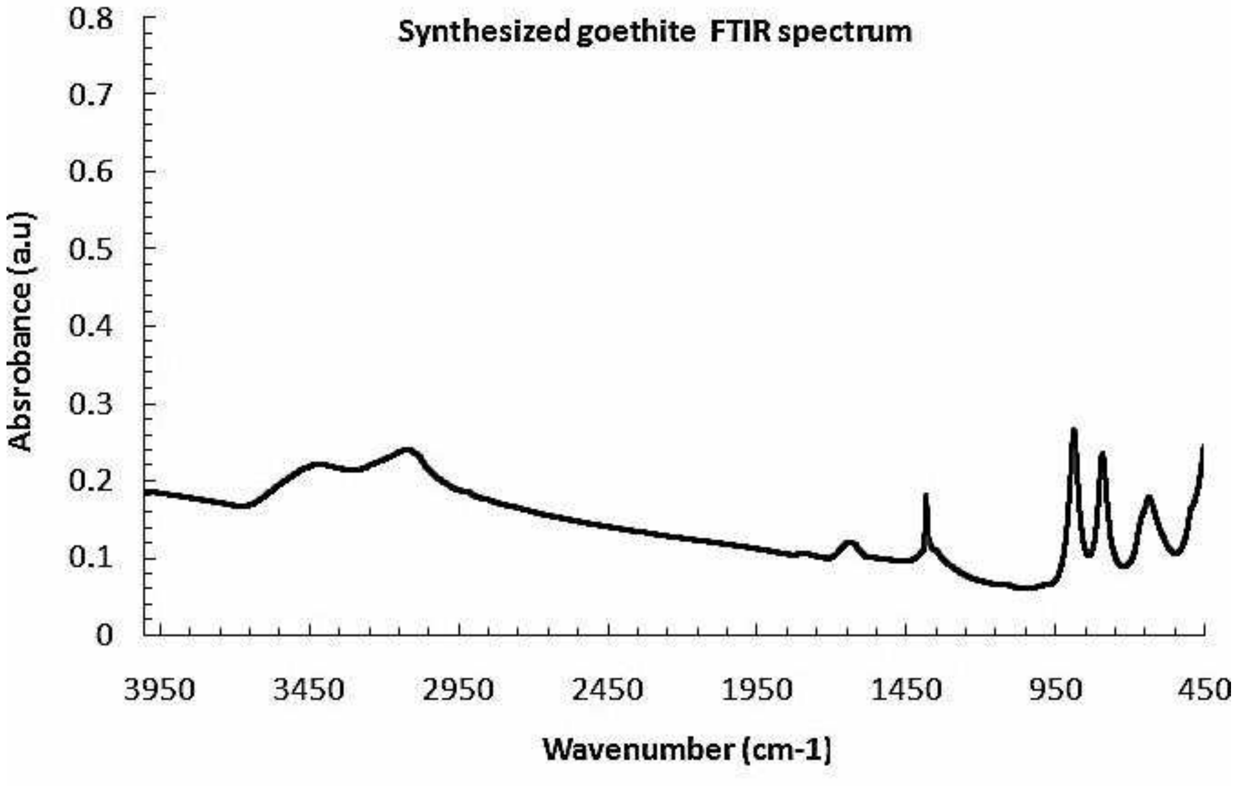

Figure S4. The FTIR spectrum of the synthetic goethite.

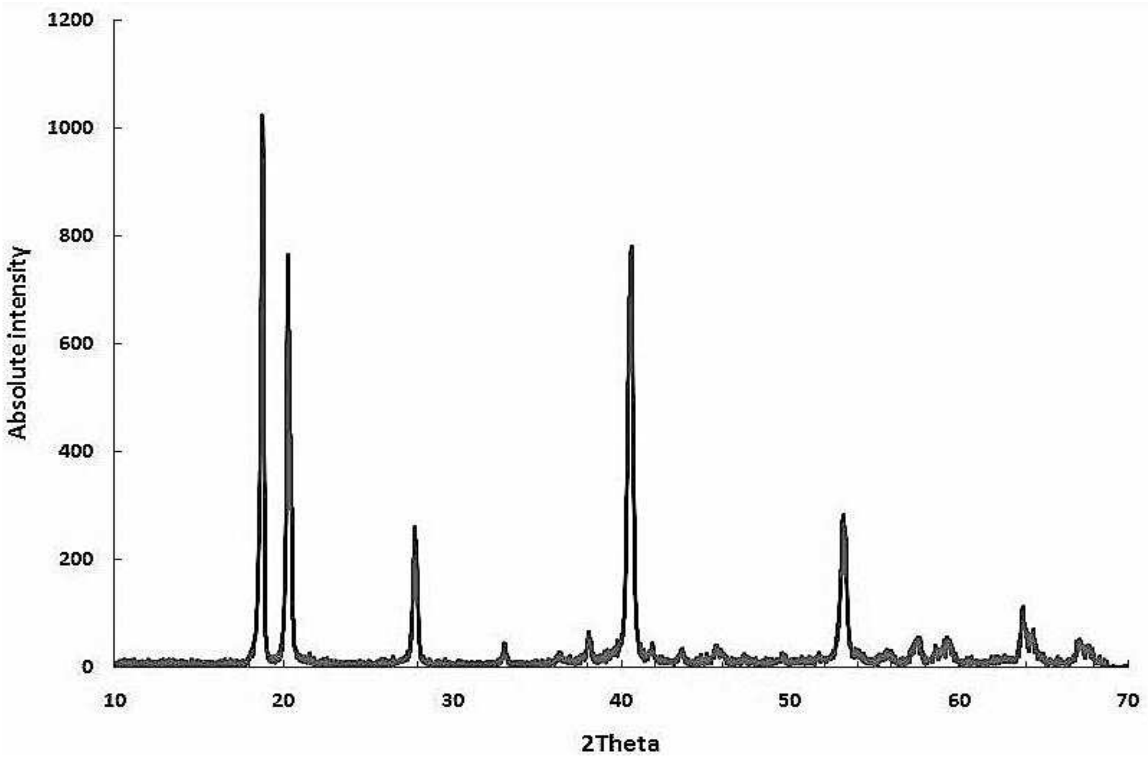

Figure S5. The XRD graph of the synthetic aluminum hydroxide.

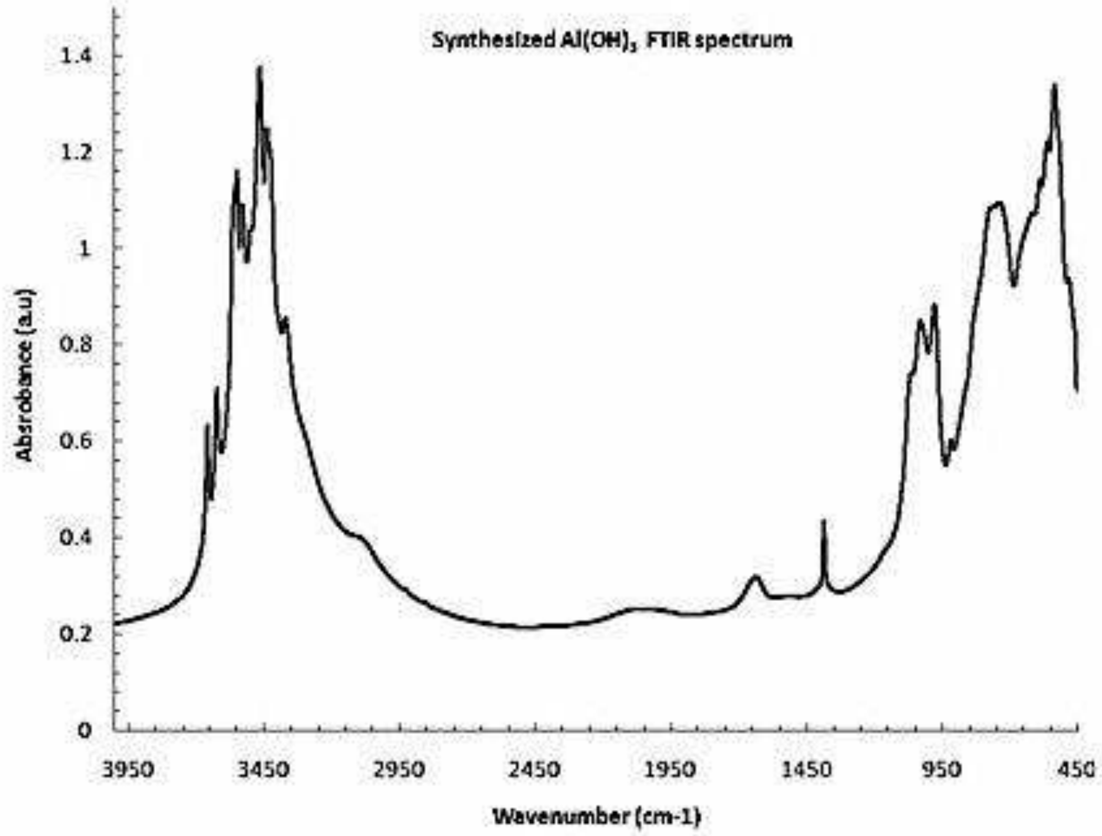

Figure S6. The FTIR spectrum for the synthetic $Al(OH)_3$.

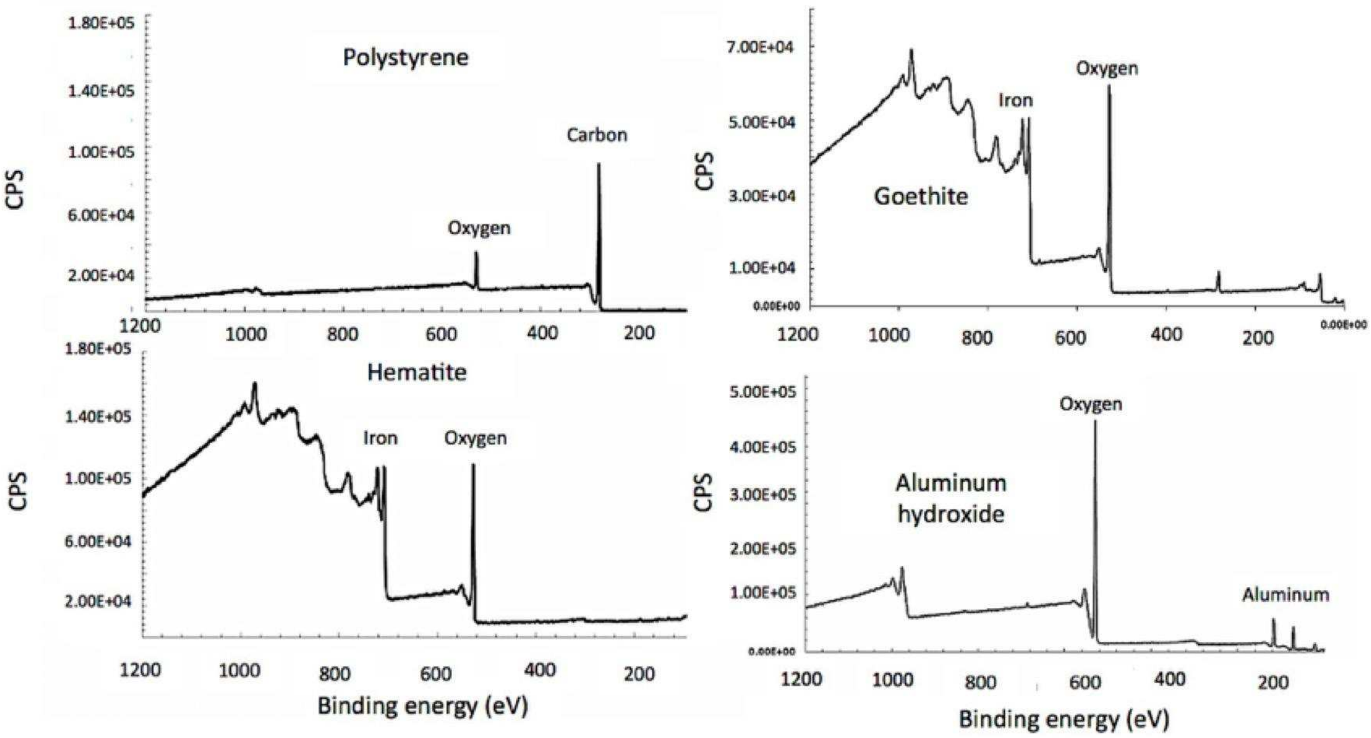

Figure S7. Recorded XPS spectra for the reference polystyrene and metal oxides coated surfaces. The spectra show non-treated reference polystyrene surface before and after coating with the synthetized hematite, goethite and aluminum hydroxide minerals.

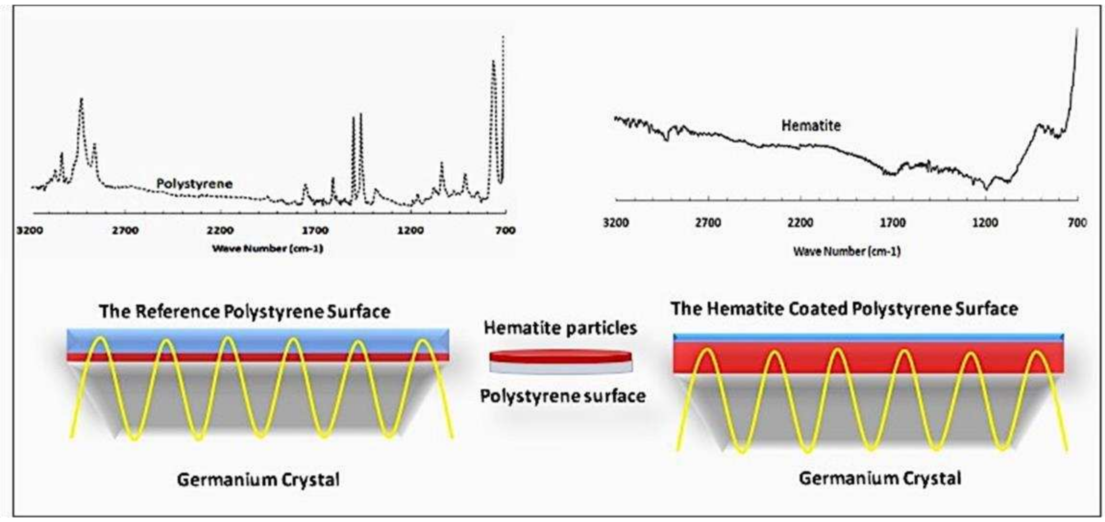

Figure S8. Schematic representation of the method use to evaluate the coated polystyrene surface, before and after coating the synthesized hematite particles using ATR-FTIR.

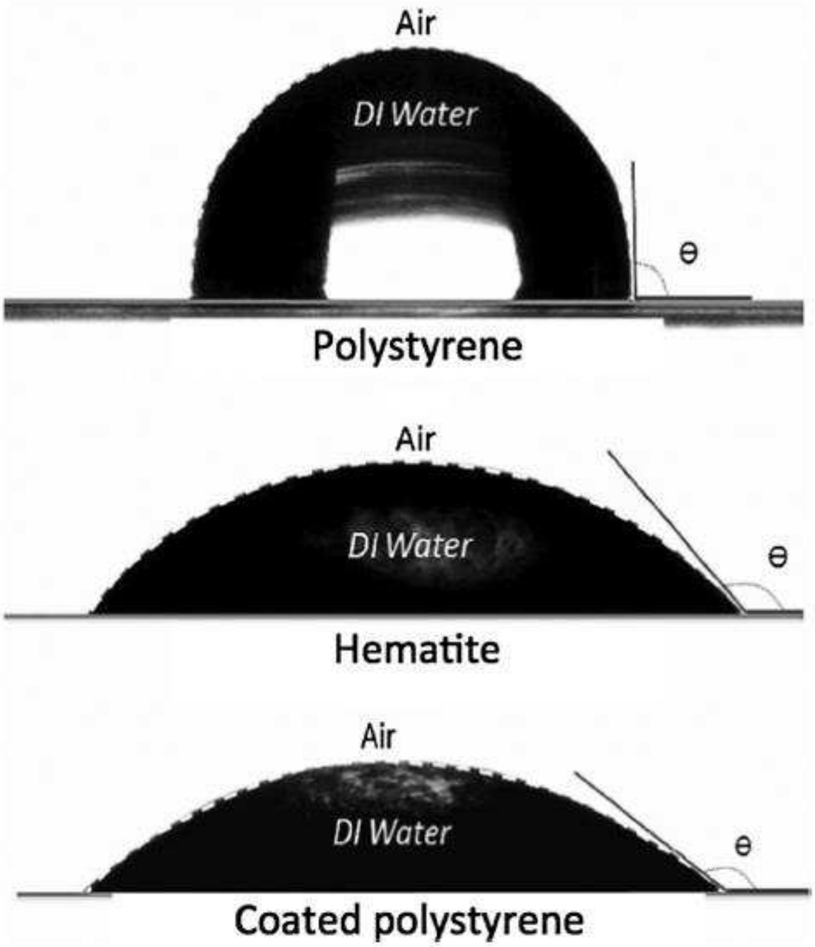

Figure S9. Water drop contact angle measurements on the reference polystyrene, the reference hematite and the hematite coated polystyrene to measure the hydrophobicity of the surfaces and compare the coated polystyrene with reference mineral surface. The water. The water drop contact angles for the goethite and aluminum hydroxide coated surfaces were less than 10 degree and below the instrument detection limit. These two surfaces are very hydrophilic. Further details can be found in this paper; H. M. Pouran, S. a. Banwart, M. Romero-Gonzales, M. Romero-Gonzalez, and M. Romero-Gonzales, 'Coating a polystyrene well-plate surface with synthetic hematite, goethite and aluminium hydroxide for cell mineral adhesion studies in a controlled environment', *Appl. Geochemistry*, vol. 42, no. 1986, pp. 60–68, 2014.

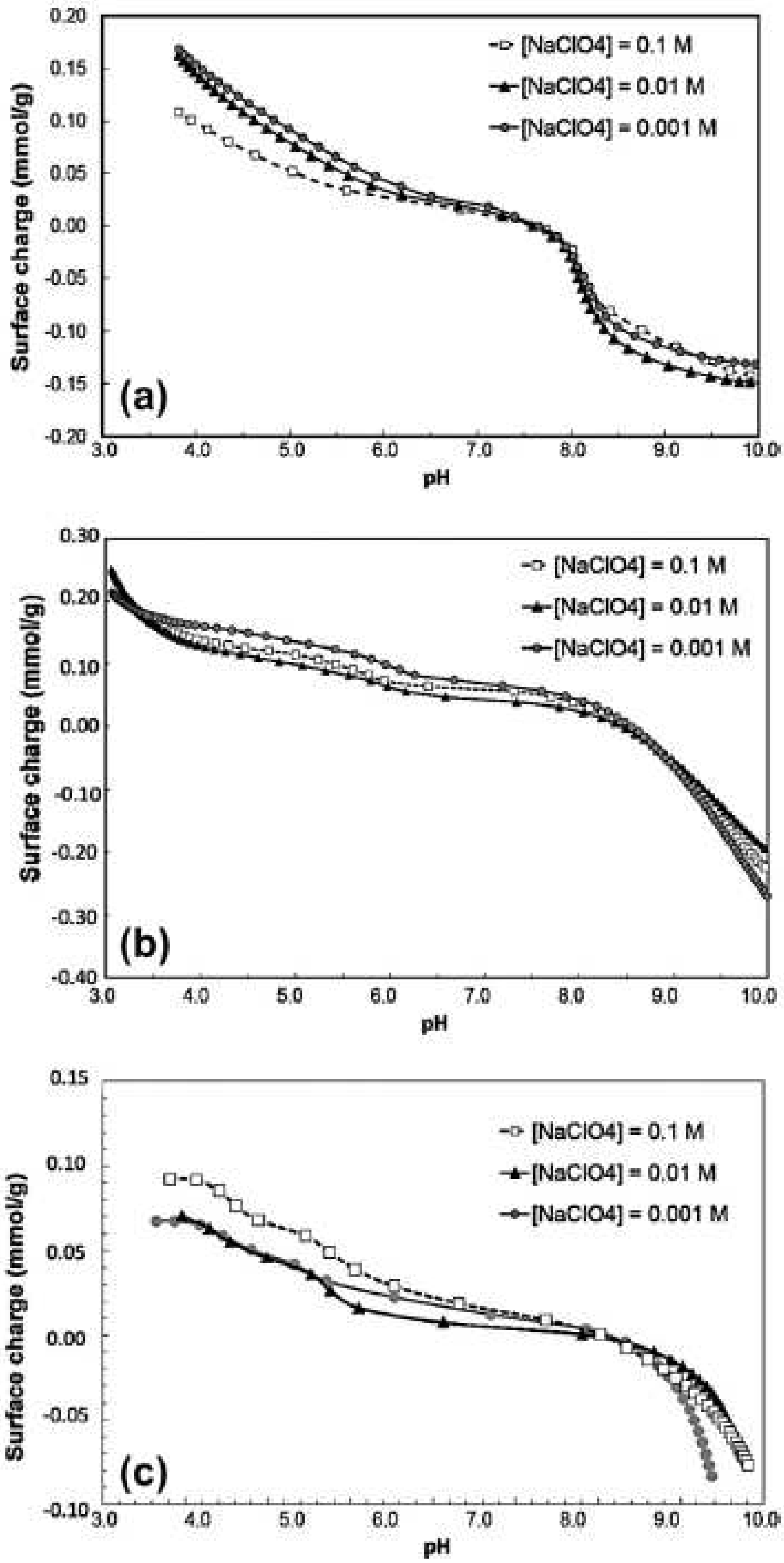

Figure S10. (a-c) potentiometric titration curves for the synthetic hematite, goethite and aluminum hydroxide respectively, in different concentrations of background electrolyte.

		Element 1		Element 2		
No	Chemical	mM Concentration	Valence	mM Concentration	Valence	Ionic Strength
1	$(NH_4)_2SO_4$	3.02E+00	1	1.51E+00	2.	4.53E+00
2	Na_2HPO_4	6.74E+00	1	3.37E+00	2	1.01E+01
3	KH_2PO_4	2.20E+00	1	2.20E+00	1	2.20E+00
4	NaCl	1.79E+02	1	1.79E+02	1	1.79E+02
5	$CaCl_2$	1.00E-02	2	2.00E-02	1.	3.00E-02
6	$MgCl_2$	1.00E-01	2	2.00E-02	1.	2.10E-01
7	$C_6H_{12}O_6$-Glucose	2.00E-01	0	0.00E+00	0	0.00E+00
8	$FeCl_3$	1.00E-03	3	3.00E-03	1	6.00E-03
9	$CaSO_4$	1.47E-06	2	1.47E-06	2	5.88E-06
10	$FeSO_4$.7H2O	7.20E-07	2	7.20E-07	2	2.88E-06
11	$MnSO_4$.H2O	1.18E-07	2	1.18E-07	2	4.73E-07
12	$CuSO_4$	1.25E-07	2	1.25E-07	2	5.02E-07
13	$ZnSo_4.7H_2O$	6.96E-08	2	6.96E-08	2	2.78E-07
14	$CoSO_4.7H_2O$	3.56E-08	2	3.56E-08	2	1.42E-07
15	$NaMoO_4.H_2O$	4.98E-08	1	4.98E-08	1	4.98E-08
16	H_3BO_3	8.09E-08	1	8.09E-08	1	8.09E-08

Solution ionic strength in mM =1.96E+02

Table S1. AB10 medium and its ionic strength

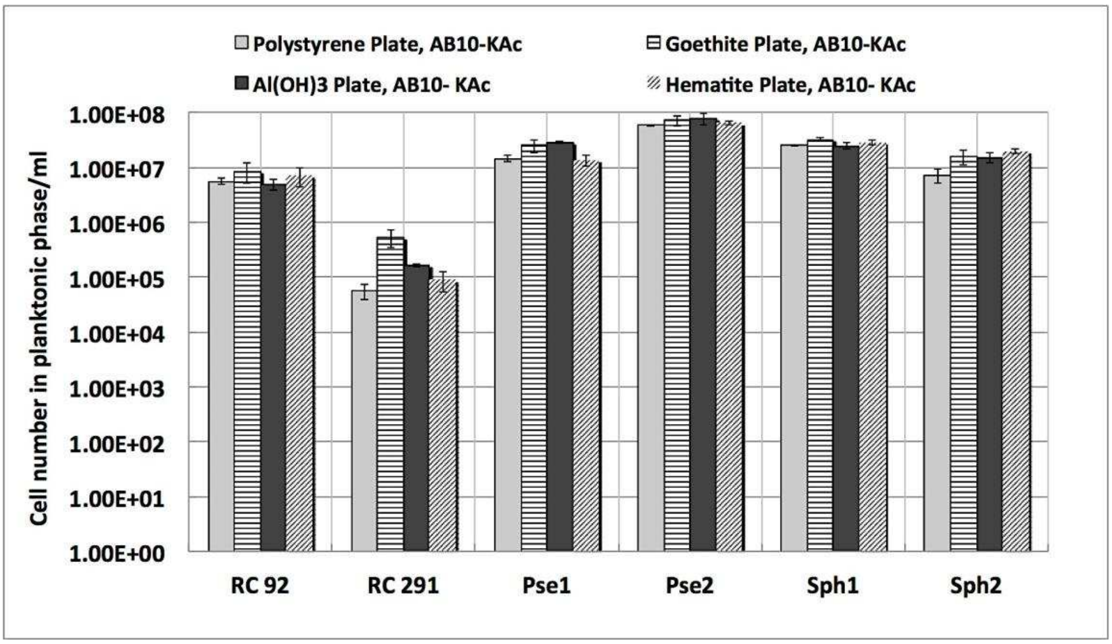

Figure S11. Total numbers of cells in planktonic phase for the mineral coated and reference polystyrene plates after 96 hours incubation in AB10 medium with potassium acetate carbon source.

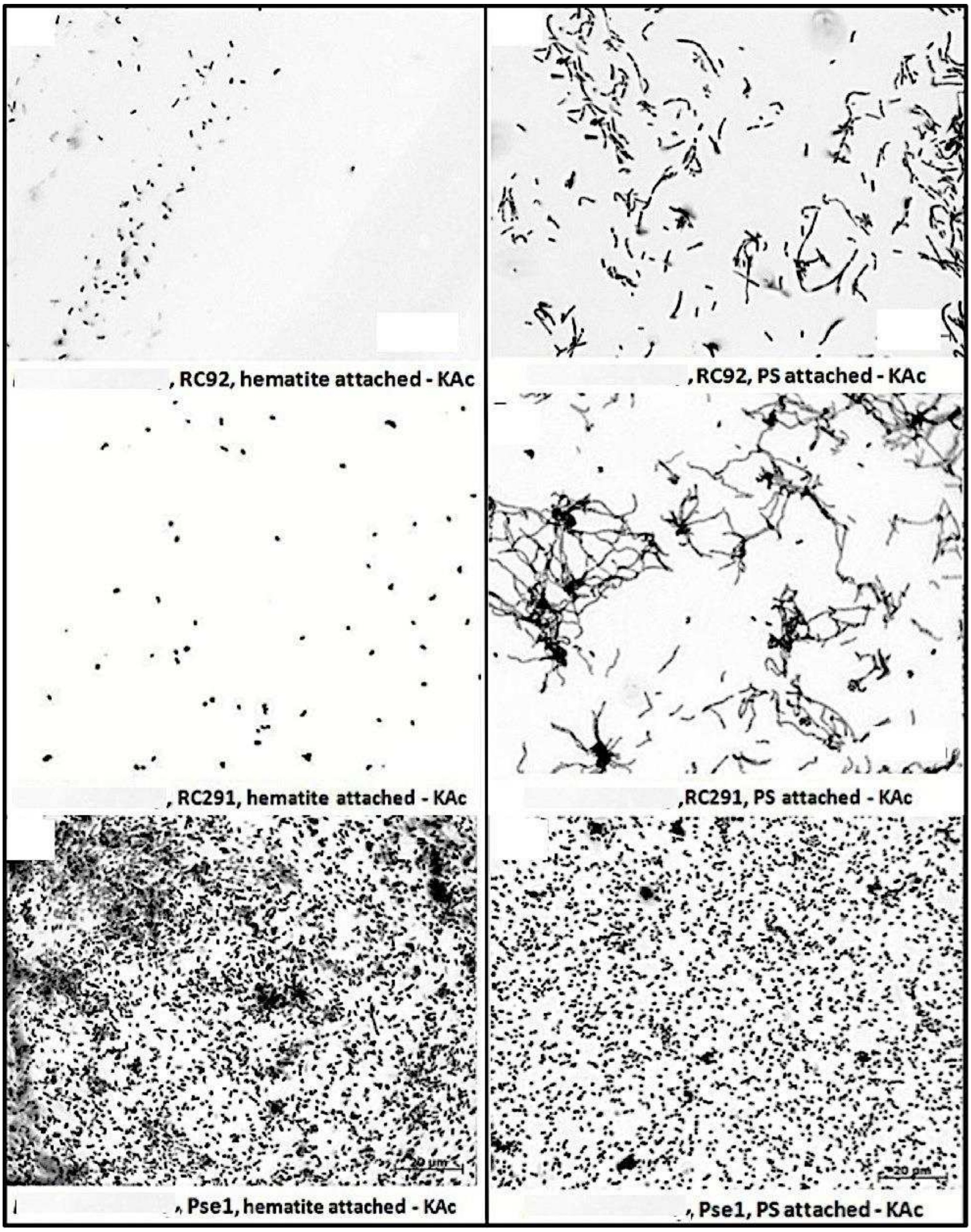

Figure S12. RC92, RC291 and Pse1 attachments to the hematite coated (left) and reference polystyrene, PS, (right) surfaces after 96 h incubation in AB10 medium with potassium acetate carbon source.

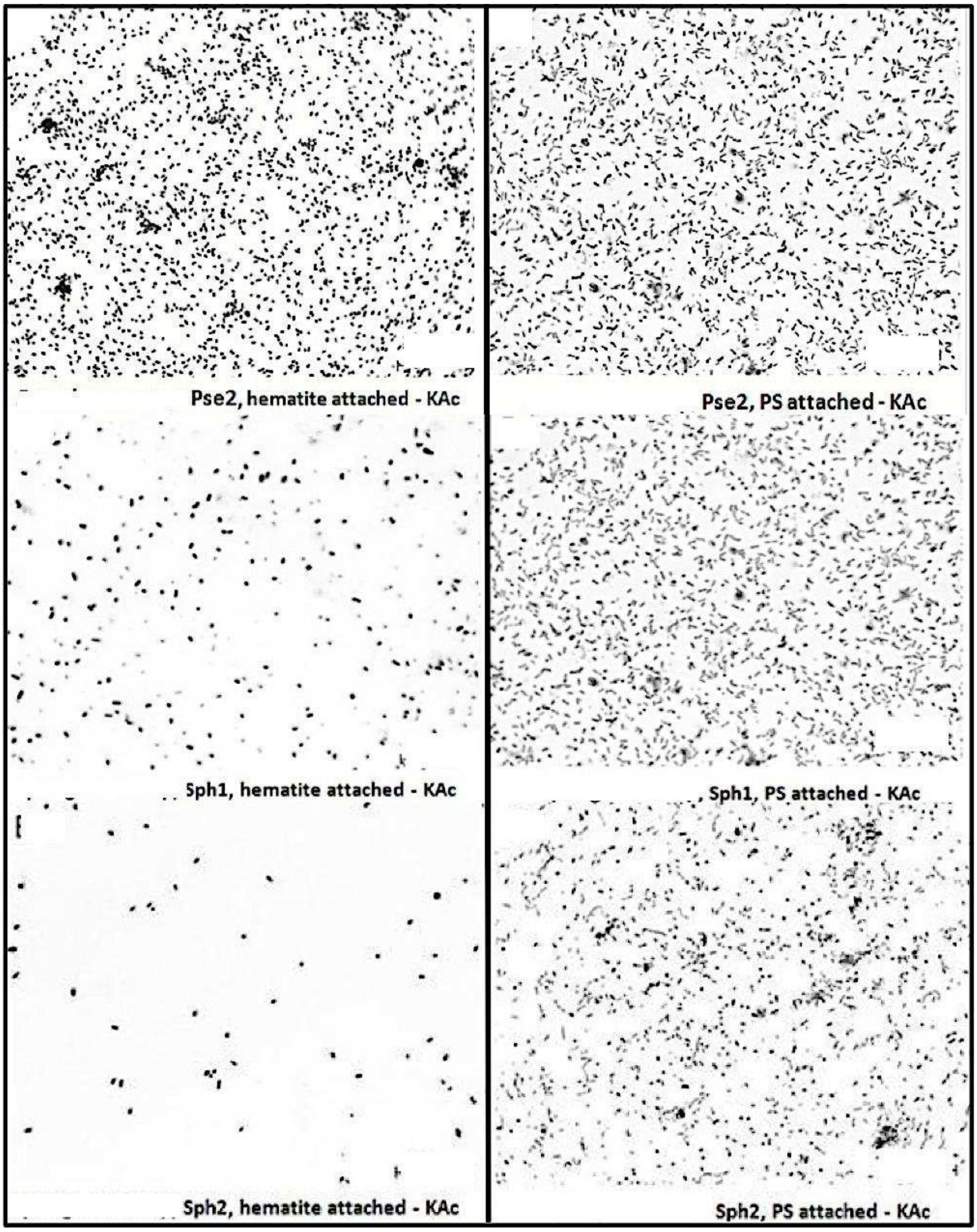

Figure S13. Pse2, Sph1 and Sph2 attachments to the hematite coated (left) and reference polystyrene, PS, (right) surfaces after 96 h incubation in AB10 medium with potassium acetate carbon source.

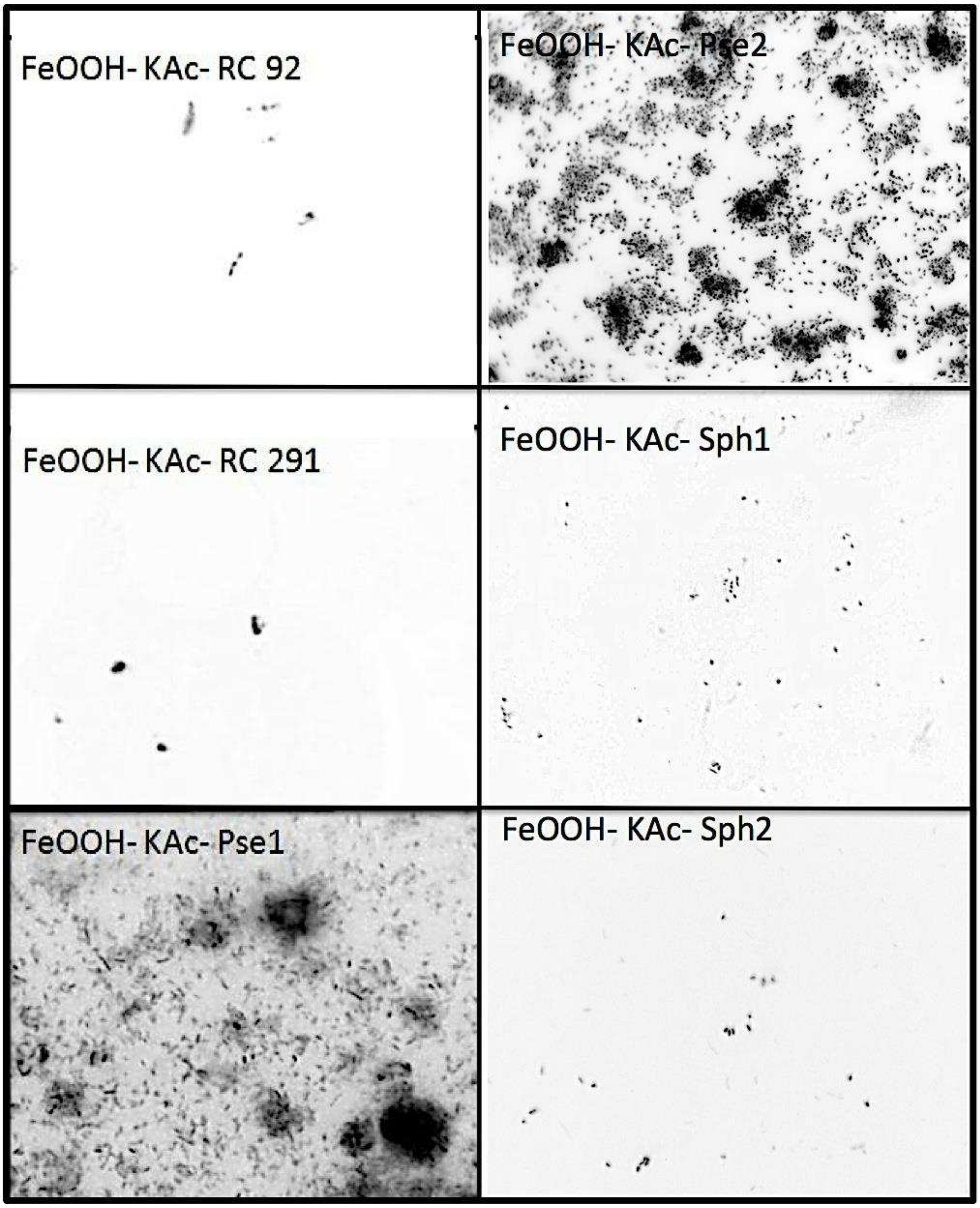

Figure S14. RC92, RC291, Pse1, Pse2, Sph1 and Sph2 attachments to the goethite coated surfaces after 96 h incubation in AB10 medium with potassium acetate carbon source.

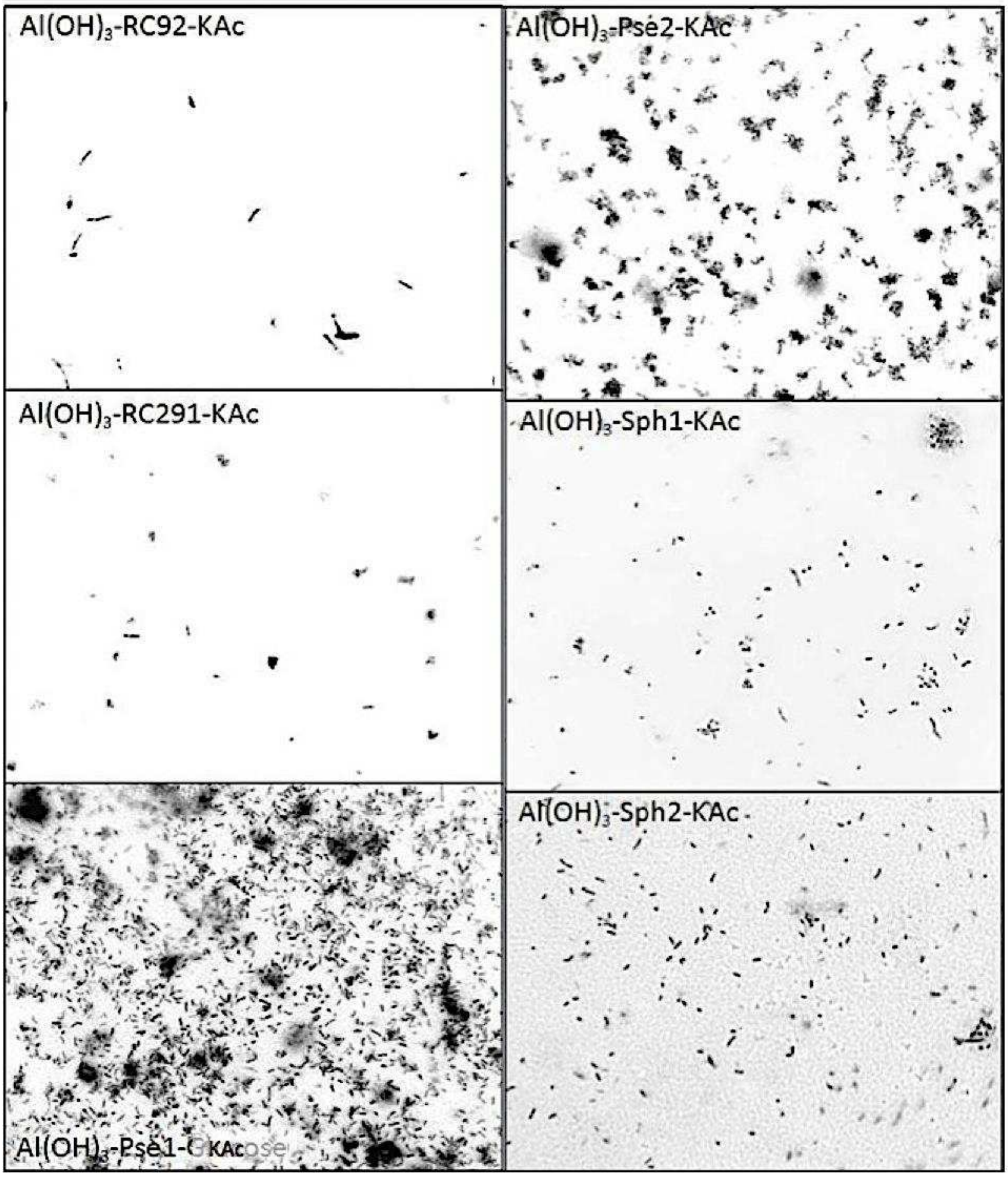

Figure S15. RC92, RC291, Pse1, Pse2, Sph1 and Sph2 attachments to the aluminum hydroxide coated surfaces after 96 h incubation in AB10 medium with potassium acetate carbon source.