Electronic Supplementary Material (ESI) for RSC Advances.

Lead ions removal from aqueous solution in a novel bioelectrochemical system with stainless steel cathode

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Figure captions

Figure A1: the changes of the surfaces of SS. The surfaces of SS were smooth at BES_1 (A) and BES_0 (C) before reaction. After 3 days, the attachment was adhered to SS symmetrically at BES_1 (B), but there was any change can be observed at BES_0 (D).

Figure A2: Product under different ratio of $Pb(NO_3)_2$ to Na_2CO_3. (A) the XRD pattern for product when Na_2CO_3 was insufficient, $Pb(NO_3)_2$* : Na_2CO_3** = 5:3 (v/v) and the standard XRD pattern for cerussite ($PbCO_3$ (PDF No. 47-1734)); (B) the XRD pattern for product when Na_2CO_3 was excess, $Pb(NO_3)_2$: Na_2CO_3 = 5:7 (v/v) and the standard XRD pattern for hydrocerussite ($Pb_3(CO_3)_2(OH)_2$ (PDF No. 13-0131)).

*0.004 mol/ L $Pb(NO_3)_2$ and 4 g/L $NaNO_3$, pH=3.7

**0.004 mol/L Na_2CO_3, pH=10.9

Figure A3: The precipitation of ions with $Fe(CN)_6^{3-}$ or $Fe(CN)_6^{4-}$. (A) The color of solution of different compounds. The concentration of all compounds was 1 g/L. (B) The reaction of $Fe(CN)_6^{3-}$ or $Fe(CN)_6^{4-}$ with different ions. 4 g/L $Fe(CN)_6^{3-}$ was added into tube 1, 3, 5, 7, 9, and 11. 4 g/L $Fe(CN)_6^{4-}$ was added into tube 2, 4, 6, 8, 10, and 12.

Figure A4: Cathode potential with time. The practical cathode potential (black) and theoretical Pb^{2+} reduction potential (red).

Figures

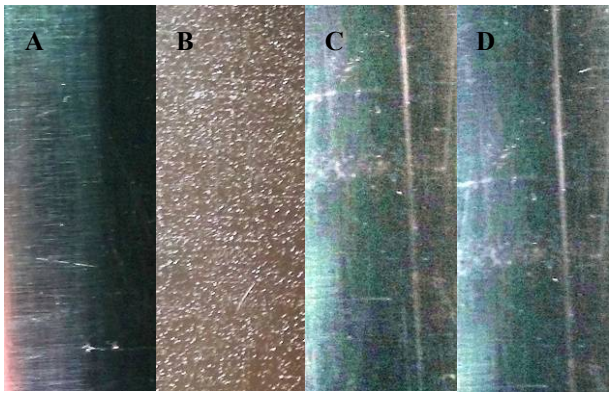

Figure A1

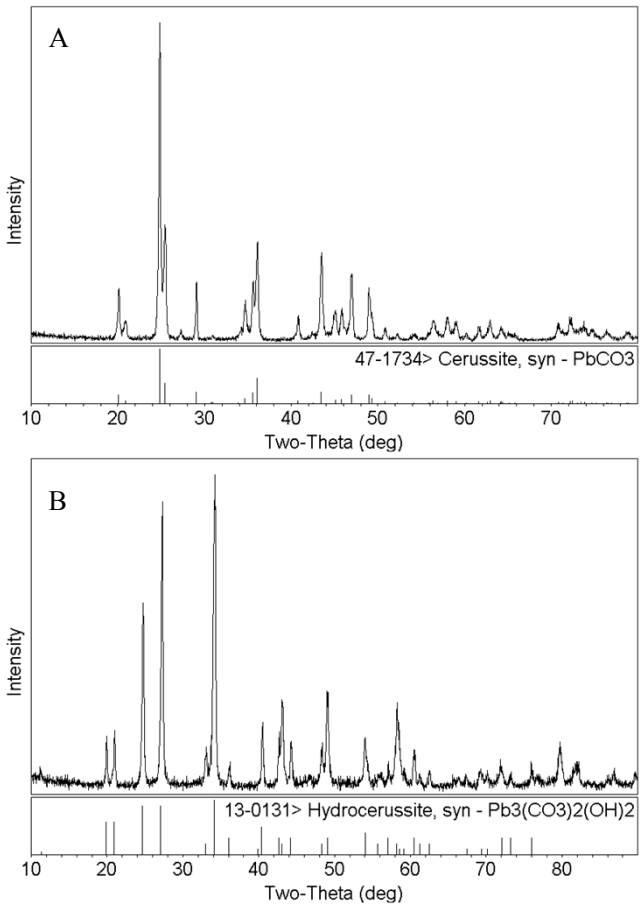
A
Intensity
47-1734> Cerussite, syn - PbCO3
10
20
30
40
50
60
70
Two-Theta (deg)
B
Intensity
13-0131> Hydrocerussite, syn - Pb3(CO3)2(OH)2
10
20
30
40
50
60
70
80
Two-Theta (deg)

Figure A2

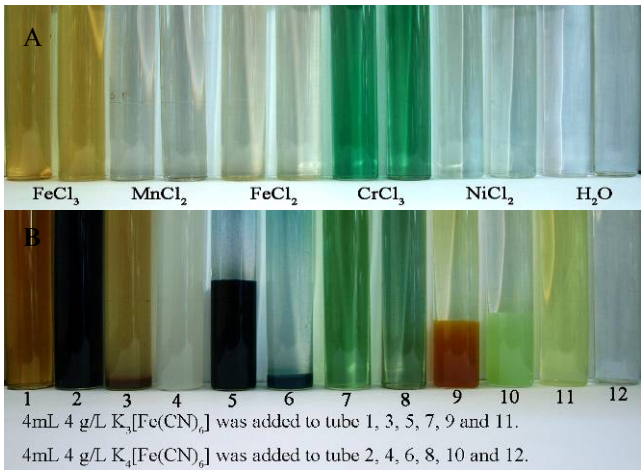
A
FeCl3
MnCl2
FeCl2
CrCl3
NiCl2
H2O
B
1 2 3 4 5 6 7 8 9 10 11 12
4mL 4 g/L K3[Fe(CN)6] was added to tube 1, 3, 5, 7, 9 and 11.
4mL 4 g/L K4[Fe(CN)6] was added to tube 2, 4, 6, 8, 10 and 12.

Figure A3

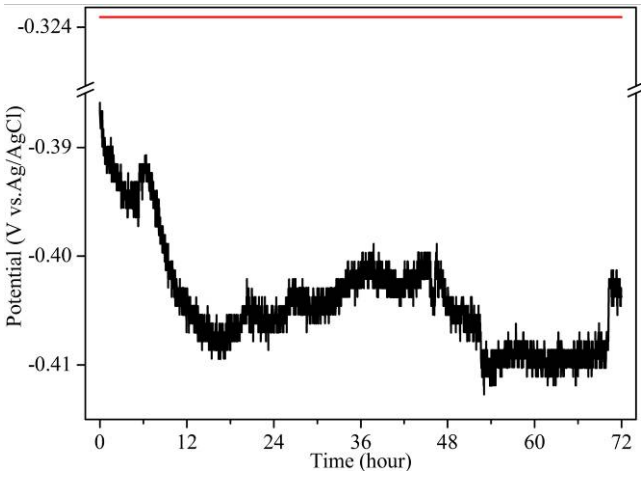
-0.324
-0.39
-0.40
-0.41
Potential (V vs.Ag/AgCl)
0
12
24
36
48
60
72
Time (hour)

Figure A4