- 1 SUPPORTING INFORMATION: A NEW METHOD TO CAPTURE THE SPATIAL AND TEMPORAL
- 2 HETEROGENEITY OF AQUATIC PLANT IRON ROOT PLAQUE *IN SITU*
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Installation

Typical Results

15

16

Figure S1 – Typical installation methods and results for pot and field applications

S2



Figure S2 – Scanned image of vinyl film in pot study after 12 days of exposure and Fe XRF map.
 Scale bar is 10 mm.



Figure S3 – Scanned image of vinyl film in pot study after 7 days of exposure and Fe XRF map.
 Open circle denotes the location where μ-EXAFS was measured. Scale bar is 5 mm.



- 29 30 Figure S4 – Individual XRF elemental maps for root shown in Figure 3C. Elemental maps were developed using spectral fitting in the PyMCA module of SMAK. Warmer colors indicate higher log
- 31 signal intensity for each element. Scale bar is 300 µm.









36 Scale bar is 1 µm. B) Substantial fine web-like morphologies are present. Scale bar is 5 µm. C)

Large tube-like and platy morphologies. Scale bar is 10 µm. D) Area of film where Fe deposition 37

38 was not visible, showing the background film. Scale bar is 5 µm.



Figure S6 - Confocal image of pot study vinyl film in area without Fe deposits. Nucleic acids
 stained by Syto 9 are shown in red and cell walls stained by calcofluor white are shown in blue.
 The vinyl film surface is shown in white. Scale bar is 20 μm.



Figure S7 – Fe plaque μ-XANES for 26 points, showing mostly As(V) in the Fe plaque, but As(III)
 was also observed.

51 FILM IMAGE ANALYSIS MATLAB CODE

```
52
     ୢୄ୶ୄୄୄୄୄୄୄୄୄୄୄୄୄୄୄୄୄୄୄୄୄୄୄୄୄୄୄ
53
     % PVC Film Image Analysis
54
     % MAL 6/21/19
55
     ଡ଼ୄଡ଼ଡ଼ଡ଼ଡ଼ଡ଼ଡ଼ଡ଼ଡ଼ଡ଼ଡ଼ଡ଼ଡ଼ଡ଼ଡ଼ଡ଼ଡ଼ଡ଼ଡ଼ଡ଼ଡ଼ଡ଼ଡ଼ଡ଼ଡ଼ଡ଼ଡ଼ଡ଼ଡ଼
56
57
     clear
58
     clc
59
     close all
60
61
     %% Constants
62
     DPI=200; %image resolution in pixels/inch
63
64
     %% Prompts
65
     Start file=input('Enter file name\n','s');
66
67
     %% Image Import and Clean
68
     I PVC=imread(Start file);
69
70
    I PVC=imcrop(I PVC);
71
72
     %%Binarize
73
     I bin=imbinarize(I PVC(:,:,3)); %blue channel captures the Fe nicely
74
     figure
75
     imshow(I_bin)
76
77
78
     %% Save Images using the starting file name
79
     save(erase(Start file,'.'),'I PVC');
80
81
     %% Output Data
82
     Outfile='Output Data.xlsx';
83
     Sheet='Sheet1';
84
     existing output=xlsread(Outfile);
85
     existing rows=1+size(existing output,1);
86
87
     sum I bin=(numel(I bin)-sum(sum(I bin)))/DPI/DPI; %total area of Fe pixels
88
     (in^2)
89
90
     % Output sheet width/length, Fe area (in^2)
91
     Outdata=[Start file num2cell([size(I bin,2)/DPI, size(I bin,1)/DPI,
92
     sum I bin])];
93
94
     xlswrite(Outfile,Outdata,Sheet,['A' num2str(existing rows+1)]);
95
96
```