Supplementary Materials

Supplementary Matlab script for the calculation of parameters and validation of the model for the low concentration of Lead Pb

S.1.1: Script for the calculation of non-linear parameters of the model

S.1.2: Script for the verification and validation of the model, comparison between the experimental Jv and the theoretical Jv for the low concentration of the solute, Lead

Supplementary Matlab script for the calculation of parameters and validation of the model for the medium concentration of Lead Pb

S.2.1: Script for the calculation of non-linear parameters of the model

S.2.2: Script for the verification and validation of the model, comparison between the experimental Jv and the theoretical Jv for the medium concentration of the solute, Lead

Supplementary Matlab script for the calculation of parameters and validation of the model for the high concentration of Lead Pb

S.3.1: Script for the calculation of non-linear parameters of the model

S.3.2: Script for the verification and validation of the model, comparison between the experimental Jv and the theoretical Jv for the high concentration of the solute, Lead

Supplementary Matlab script for the calculation of parameters and validation of the model for the low concentration of Arsenic As

S.4.1: Script for the calculation of non-linear parameters of the model

S.4.2: Script for the verification and validation of the model, comparison between the experimental Jv and the theoretical Jv for the low concentration of the solute, Arsenic

Supplementary Matlab script for the calculation of parameters and validation of the model for the medium concentration of Arsenic As

S.5.1: Script for the calculation of non-linear parameters of the model

S.5.2: Script for the verification and validation of the model, comparison between the experimental Jv and the theoretical Jv for the medium concentration of the solute, Arsenic

Supplementary Matlab script for the calculation of parameters and validation of the model for the high concentration of Arsenic As

S.6.1: Script for the calculation of non-linear parameters of the model

S.6.2: Script for the verification and validation of the model, comparison between the experimental Jv and the theoretical Jv for the high concentration of the solute, Arsenic

Supplementary: Evolution of the Jv

Figures S7 to S15, evolution of Pb and figures S16 to S24 for arsenic

Supplementary: Matlab script for the calculation of parameters and validation of the model for the low concentration of Lead Pb

S.1.1: Script for the calculation of non-linear parameters of the model

```
%PLOMO (Pb) - CONCENTRACION BAJA
%CALCULO DE LOS PARAMENTROS LP Y k DEL PLOMO PARA LA CONCENTRACION BAJA de
%la sal de metal+NaCl
clear all
clc
load PBBAJOFAT
dp = PBBAJOFAT(:,3);
R = PBBAJOFAT(:,4);
T = PBBAJOFAT(:,5);
Cf = PBBAJOFAT(:,6);
Cp = PBBAJOFAT(:,7);
Jv = PBBAJOFAT(:,8);
FaT = PBBAJOFAT(:,10);
S=0.99;
x1 = dp.*FaT;
x2 = S.*R.*T.*(Cf-Cp).*FaT;
x3 = Jv;
X = [x1, x2, x3];
Y = x3;
modelfun = @(b,x)(b(1)*x(:,1) - b(1)*x(:,2).*exp(x(:,3)/b(2)));
beta0 = [0.001;0.00001];%%%
beta = nlinfit(X,Y,modelfun,beta0);
format long
disp(beta)
```

S.1.2: Script for the verification and validation of the model, comparison between the experimental Jv and the theoretical Jv for the low concentration of the solute, Lead

```
%PLOMO (Pb) - CONCENTRACION BAJA
%CALCULO DEL JV (TEORICO) Y GRAFICAS COMPARATIVAS ENRE EL Jv(Teórico) y el
%Jv(experimental)PARA EL PLOMO EN LA CONCENTRACION BAJA de la sal de metal+NaCl
clear all
clc
load PBBAJOFAT
t = PBBAJOFAT(:,2);
dp = PBBAJOFAT(:,3);
R = PBBAJOFAT(:,4);
T = PBBAJOFAT(:,5);
Cf = PBBAJOFAT(:,6);
Cp = PBBAJOFAT(:,7);
Jv = PBBAJOFAT(:,8);
FaT = PBBAJOFAT(:,10);
% probando
Lp =    0.0000000000186511944;
S =     0.99;
k =  0.0000115205243721058;
x=t;
y = Lp*(dp.*FaT-S.*FaT.*R.*T.*(Cf-Cp).*exp(Jv/k));
plot(x,y,'r'), hold
plot(x,Jv, 'b')
legend('Jv Theoretical', 'Jv Experimental')
```

Supplementary: Matlab script for the calculation of parameters and validation of the model for the medium concentration of Lead Pb

S.2.1: Script for the calculation of non-linear parameters of the model

```
%PLOMO (Pb) - CONCENTRACION MEDIA
%CALCULO DE LOS PARAMENTROS LP Y k DEL PLOMO PARA LA CONCENTRACION MEDIA de
%la sal de metal+NaCl
clear all
clc
load PBMEDIOFAT
dp = PBMEDIOFAT(:,3);
R = PBMEDIOFAT(:,4);
T = PBMEDIOFAT(:,5);
Cf = PBMEDIOFAT(:,6);
Cp = PBMEDIOFAT(:,7);
Jv = PBMEDIOFAT(:,8);
FaT = PBMEDIOFAT(:,10);
S=0.9917;
x1 = dp.*FaT;
x2 = S.*R.*T.*(Cf-Cp).*FaT;
x3 = Jv;
X = [x1, x2, x3];
Y = x3;
modelfun = @(b,x)(b(1)*x(:,1) - b(1)*x(:,2).*exp(x(:,3)/b(2)));
beta0 = [0.019;0.000003];%%%
beta = nlinfit(X,Y,modelfun,beta0);
format long
disp(beta)
```

S.2.2: Script for the verification and validation of the model, comparison between the experimental Jv and the theoretical Jv for the medium concentration of the solute, Lead

```
%PLOMO (Pb) - CONCENTRACION MEDIO
%CALCULO DEL JV (TEORICO) Y GRAFICAS COMPARATIVAS ENRE EL Jv(Teórico) y el
%Jv(experimental)PARA EL PLOMO EN LA CONCENTRACION MEDIA de la sal de metal+NaCl
clear all
clc
load PBMEDIOFAT
t = PBMEDIOFAT(:,2);
dp = PBMEDIOFAT(:,3);
R = PBMEDIOFAT(:,4);
T = PBMEDIOFAT(:,5);
Cf = PBMEDIOFAT(:,6);
Cp = PBMEDIOFAT(:,7);
Jv = PBMEDIOFAT(:,8);
FaT = PBMEDIOFAT(:,10);
% probando
Lp =    0.000000000016976;
S =     0.9917;
k =   0.005155164841660;
x=t;
y = Lp*(dp.*FaT-S.*FaT.*R.*T.*(Cf-Cp).*exp(Jv/k));
plot(x,y,'r'), hold
plot(x,Jv, 'b')
legend('Jv Theoretical', 'Jv Experimental')
```

Supplementary: Matlab script for the calculation of parameters and validation of the model for the high concentration of Lead Pb

S.3.1: Script for the calculation of non-linear parameters of the model

```
%PLOMO (Pb) - CONCENTRACION ALTA
%CALCULO DE LOS PARAMENTROS LP Y k DEL PLOMO PARA LA CONCENTRACION ALTA de
%la sal de metal+NaCl
clear all
clc
load PBALTOFAT
dp = PBALTOFAT(:,3);
R = PBALTOFAT(:,4);
T = PBALTOFAT(:,5);
Cf = PBALTOFAT(:,6);
Cp = PBALTOFAT(:,7);
Jv = PBALTOFAT(:,8);
FaT = PBALTOFAT(:,10);
S=0.9921;
x1 = dp.*FaT;
x2 = S.*R.*T.*(Cf-Cp).*FaT;
x3 = Jv;
X = [x1, x2, x3];
Y = x3;
modelfun = @(b,x)(b(1)*x(:,1) - b(1)*x(:,2).*exp(x(:,3)/b(2)));
beta0 = [0.00001;0.0000101];%%%
beta = nlinfit(X,Y,modelfun,beta0);
format long
disp(beta)
```

S.3.2: Script for the verification and validation of the model, comparison between the experimental Jv and the theoretical Jv for the high concentration of the solute, Lead

```
%PLOMO (Pb) - CONCENTRACION ALTA
%CALCULO DEL JV (TEORICO) Y GRAFICAS COMPARATIVAS ENRE EL Jv(Teórico) y el
%Jv(experimental)PARA EL PLOMO EN LA CONCENTRACION ALTA de la sal de metal+NaCl
clear all
clc
load PBALTOFAT
t = PBALTOFAT(:,2);
dp = PBALTOFAT(:,3);
R = PBALTOFAT(:,4);
T = PBALTOFAT(:,5);
Cf = PBALTOFAT(:,6);
Cp = PBALTOFAT(:,7);
Jv = PBALTOFAT(:,8);
FaT = PBALTOFAT(:,10);
% probando
Lp =    0.000000000015528;
S =     0.9921;
k =   0.006944871296584;
y = Lp*(dp.*FaT-S.*FaT.*R.*T.*(Cf-Cp).*exp(Jv/k));
x=t;
plot(x,y,'r'), hold
plot(x,Jv, 'b')
legend('Jv Theoretical', 'Jv Experimental')
```

Supplementary: Matlab script for the calculation of parameters and validation of the model for the low concentration of Arsenic As

S.4.1: Script for the calculation of non-linear parameters of the model

```
%ARSENICO (As) - CONCENTRACION ALTA
%CALCULO DE LOS PARAMENTROS LP Y k DEL ARSENICO PARA LA CONCENTRACION ALTA
%del metal+NaCl
clear all
clc
load ASBAJOFAT
dp = ASBAJOFAT(:,3);
R = ASBAJOFAT(:,4);
T = ASBAJOFAT(:,5);
Cf = ASBAJOFAT(:,6);
Cp = ASBAJOFAT(:,7);
Jv = ASBAJOFAT(:,9);
FaT = ASBAJOFAT(:,12);
S=0.9935;
x1 = dp.*FaT;
x2 = S.*R.*T.*(Cf-Cp).*FaT;
x3 = Jv;
X = [x1, x2, x3];
Y = x3;
modelfun = @(b,x)(b(1)*x(:,1) - b(1)*x(:,2).*exp(x(:,3)/b(2)));
beta0 = [0.00001;0.000002];%%%
beta = nlinfit(X,Y,modelfun,beta0);
format long
disp(beta)
```

S.4.2: Script for the verification and validation of the model, comparison between the experimental Jv and the theoretical Jv for the low concentration of the solute, Arsenic

```
%ARSENICO (As) - CONCENTRACION BAJA
%CALCULO DEL JV (TEORICO) Y GRAFICAS COMPARATIVAS ENRE EL Jv(Teórico) y el
%Jv(experimental)PARA EL ARSENICO EN LA CONCENTRACION BAJA del metal+NaCl
clear all
clc
load ASBAJOFAT
t = ASBAJOFAT(:,2);
dp = ASBAJOFAT(:,3);
R = ASBAJOFAT(:,4);
T = ASBAJOFAT(:,5);
Cf = ASBAJOFAT(:,6);
Cp = ASBAJOFAT(:,7);
Jv = ASBAJOFAT(:,9);
FaT = ASBAJOFAT(:,12);
% probando
Lp =    0.00000000001721833853;
S =     0.9935;
k =  0.00000560428013930267;
x=t;
y = Lp*(dp.*FaT-S.*FaT.*R.*T.*(Cf-Cp).*exp(Jv/k));
plot(x,y,'r'), hold
plot(x,Jv, 'b')
legend('Jv Theoretical', 'Jv Experimental')
```

Supplementary: Matlab script for the calculation of parameters and validation of the model for the medium concentration of Arsenic As

S.5.1: Script for the calculation of non-linear parameters of the model

```
%ARSENICO (As) - CONCENTRACION MEDIA
%CALCULO DE LOS PARAMENTROS LP Y k DEL ARSENICO PARA LA CONCENTRACION MEDIA
%del metal+NaCl
clear all
clc
load ASMEDIOFAT
dp = ASMEDIOFAT(:,3);
R = ASMEDIOFAT(:,4);
T = ASMEDIOFAT(:,5);
Cf = ASMEDIOFAT(:,6);
Cp = ASMEDIOFAT(:,7);
Jv = ASMEDIOFAT(:,9);
FaT = ASMEDIOFAT(:,12);
S=0.989;
x1 = dp.*FaT;
x2 = S.*R.*T.*(Cf-Cp).*FaT;
x3 = Jv;
X = [x1, x2, x3];
Y = x3;
modelfun = @(b,x)(b(1)*x(:,1) - b(1)*x(:,2).*exp(x(:,3)/b(2)));
beta0 = [0.00005;0.0000089];%%%
beta = nlinfit(X,Y,modelfun,beta0);
format long
disp(beta)
```

S.5.2: Script for the verification and validation of the model, comparison between the experimental Jv and the theoretical Jv for the medium concentration of the solute, Arsenic

```
%ARSENICO (As) - CONCENTRACION MEDIA
%CALCULO DEL JV (TEORICO) Y GRAFICAS COMPARATIVAS ENRE EL Jv(Teórico) y el
%Jv(experimental)PARA EL ARSENICO EN LA CONCENTRACION MEDIA del metal+NaCl
clear all
clc
load ASMEDIOFAT
t = ASMEDIOFAT(:,2);
dp = ASMEDIOFAT(:,3);
R = ASMEDIOFAT(:,4);
T = ASMEDIOFAT(:,5);
Cf = ASMEDIOFAT(:,6);
Cp = ASMEDIOFAT(:,7);
Jv = ASMEDIOFAT(:,9);
FaT = ASMEDIOFAT(:,12);
% probando
Lp =    0.00000000002116029833;
S =     0.989;
k =  0.00000583688499826593;
x=t;
y = Lp*(dp.*FaT-S.*FaT.*R.*T.*(Cf-Cp).*exp(Jv/k));
plot(x,y,'r'), hold
plot(x,Jv, 'b')
legend('Jv Theoretical', 'Jv Experimental')
```

Supplementary: Matlab script for the calculation of parameters and validation of the model for the high concentration of Arsenic As

S.6.1: Script for the calculation of non-linear parameters of the model

```
%ARSENICO (As) - CONCENTRACION ALTA
%CALCULO DE LOS PARAMENTROS LP Y k DEL ARSENICO PARA LA CONCENTRACION ALTA
%del metal+NaCl
clear all
clc
load ASALTOFAT
dp = ASALTOFAT(:,3);
R = ASALTOFAT(:,4);
T = ASALTOFAT(:,5);
Cf = ASALTOFAT(:,6);
Cp = ASALTOFAT(:,7);
Jv = ASALTOFAT(:,9);
FaT = ASALTOFAT(:,12);
S=0.9912;
x1 = dp.*FaT;
x2 = S.*R.*T.*(Cf-Cp).*FaT;
x3 = Jv;
X = [x1, x2, x3];
Y = x3;
modelfun = @(b,x)(b(1)*x(:,1) - b(1)*x(:,2).*exp(x(:,3)/b(2)));
beta0 = [0.01;0.00001];%%%
beta = nlinfit(X,Y,modelfun,beta0);
format long
disp(beta)
```

S.6.2: Script for the verification and validation of the model, comparison between the experimental Jv and the theoretical Jv for the high concentration of the solute, Arsenic

```
%ARSENICO (As) - CONCENTRACION ALTA
%CALCULO DEL JV (TEORICO) Y GRAFICAS COMPARATIVAS ENRE EL Jv(Teórico) y el
%Jv(experimental)PARA EL ARSENICO EN LA CONCENTRACION ALTA del metal+NaCl
clear all
clc
load ASALTOFAT
t = ASALTOFAT(:,2);
dp = ASALTOFAT(:,3);
R = ASALTOFAT(:,4);
T = ASALTOFAT(:,5);
Cf = ASALTOFAT(:,6);
Cp = ASALTOFAT(:,7);
Jv = ASALTOFAT(:,9);
FaT = ASALTOFAT(:,12);
% probando
Lp =    0.00000000001904335884;
S =     0.9912;
k =  0.00000749092766652238;
x=t;
y = Lp*(dp.*FaT-S.*FaT.*R.*T.*(Cf-Cp).*exp(Jv/k));
plot(x,y,'r'), hold
plot(x,Jv, 'b')
legend('Jv Theoretical', 'Jv Experimental')
```

Supplementary: Evolution of the Jv

Figure S7: Evolution of Jv for Pb with 5 Bar pressure and low concentration

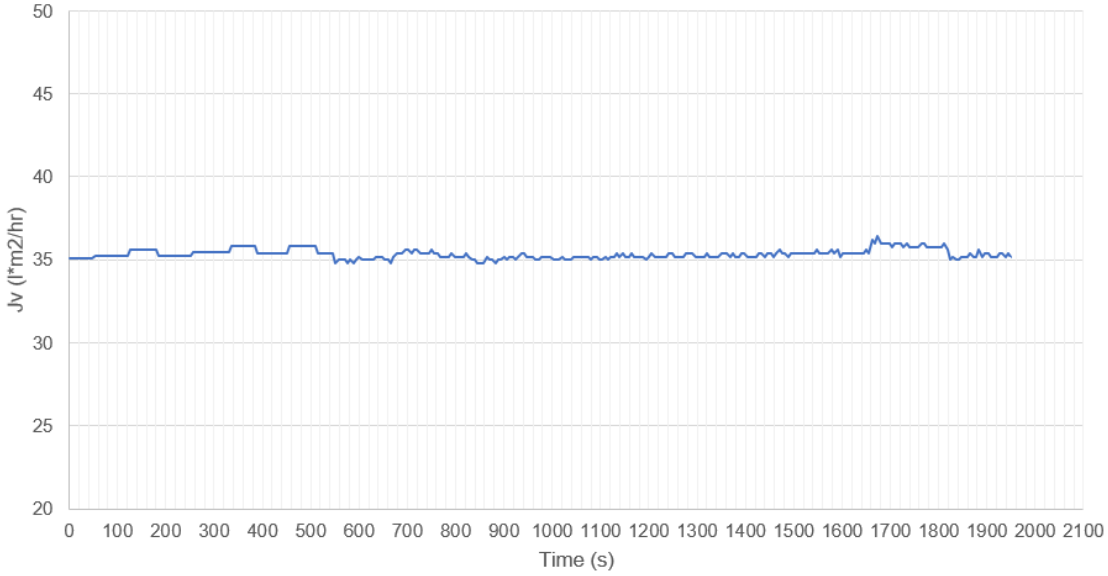

Figure S8: Evolution of Jv for Pb with 7.5 Bar pressure and low concentration

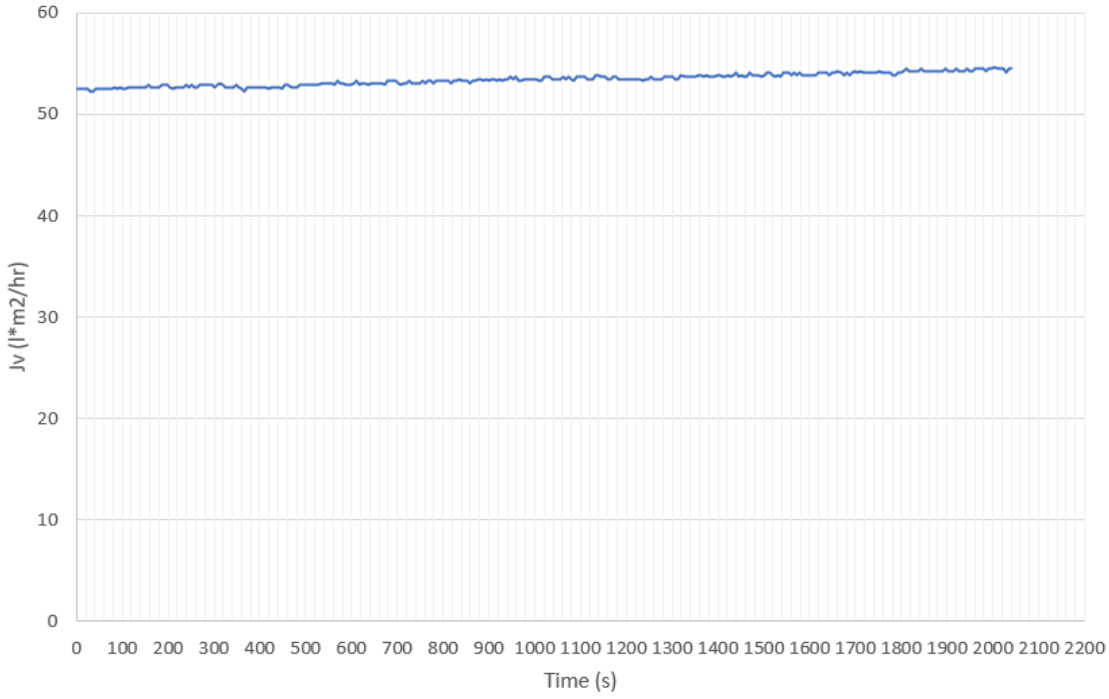

Figure S9: Evolution of Jv for Pb with 10.0 Bar pressure and low concentration

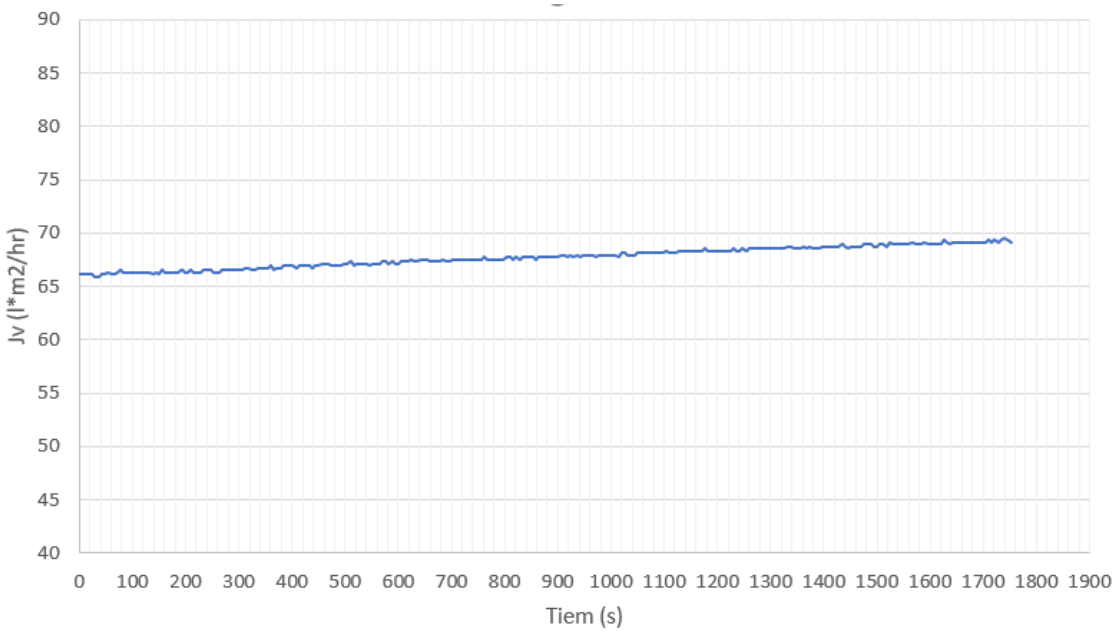

Figure S10: Evolution of Jv for Pb with 5.0 Bar pressure and medium concentration

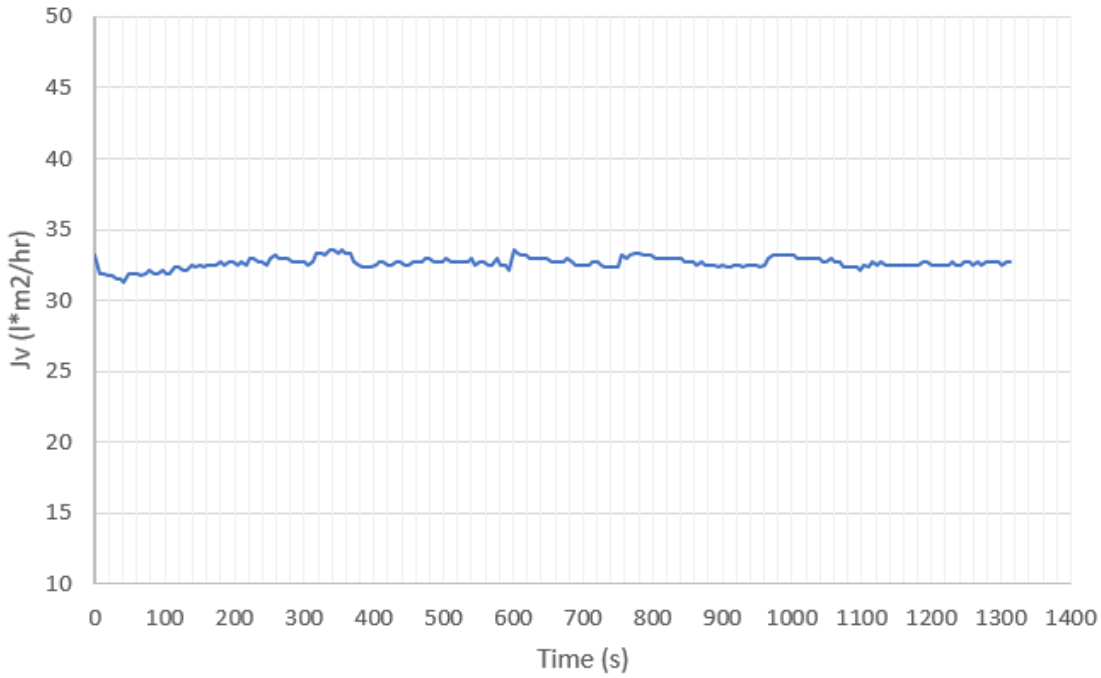

Figure S11: Evolution of Jv for Pb with 7.5 Bar pressure and medium concentration

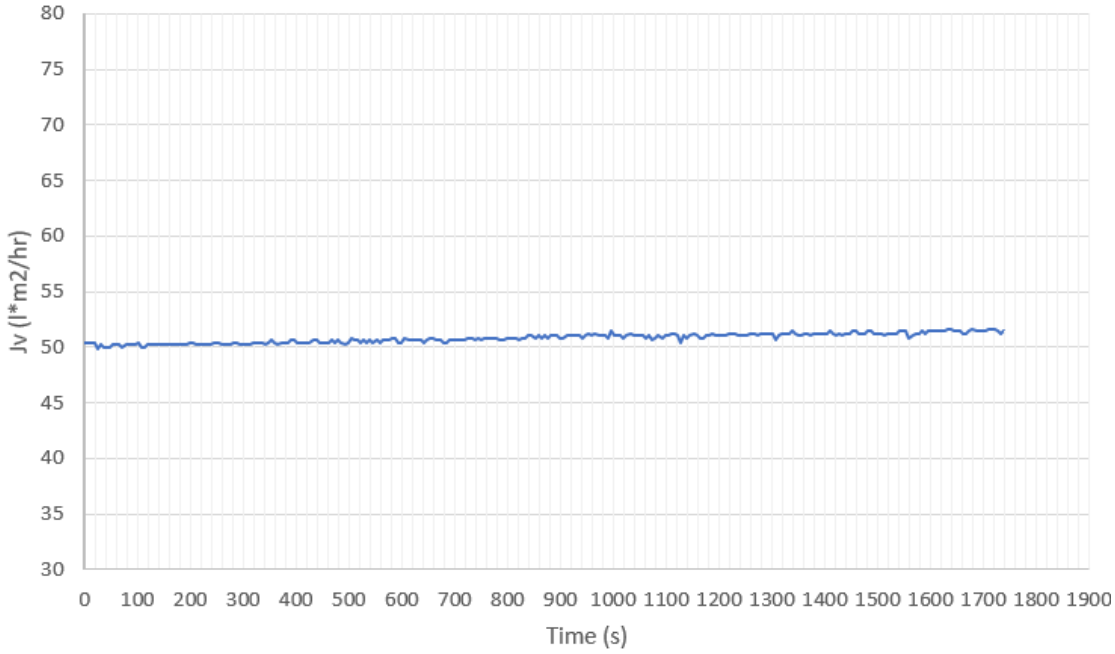

Figure S12: Evolution of Jv for Pb with 10.0 Bar pressure and medium concentration

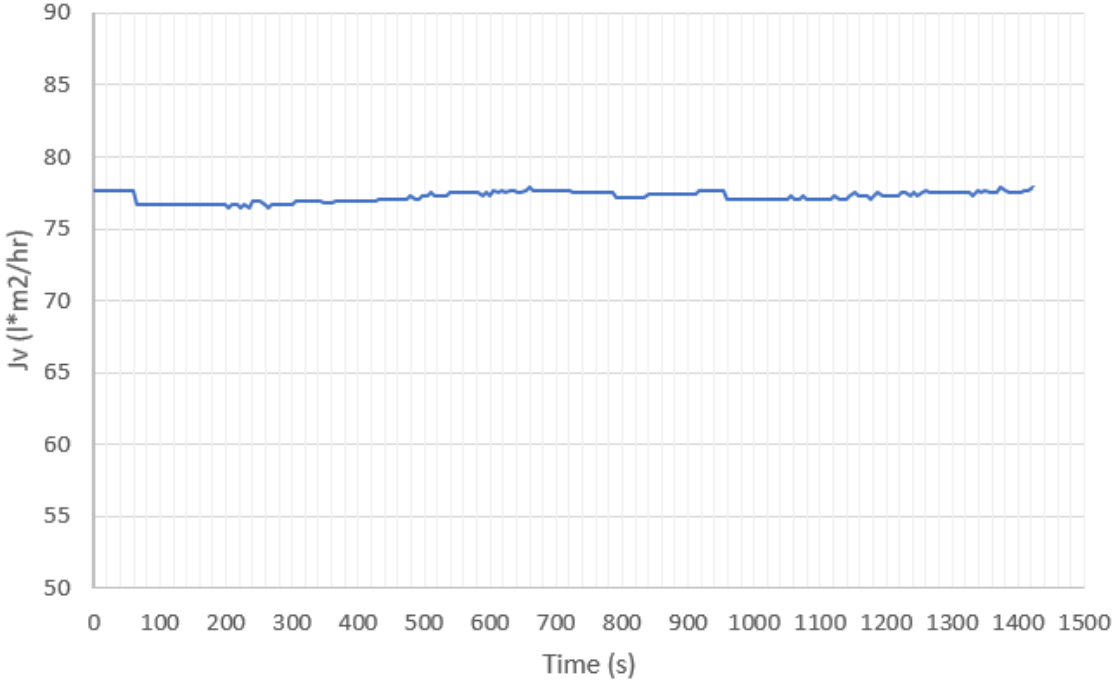

Figure S13: Evolution of Jv for Pb with 5.0 Bar pressure and high concentration

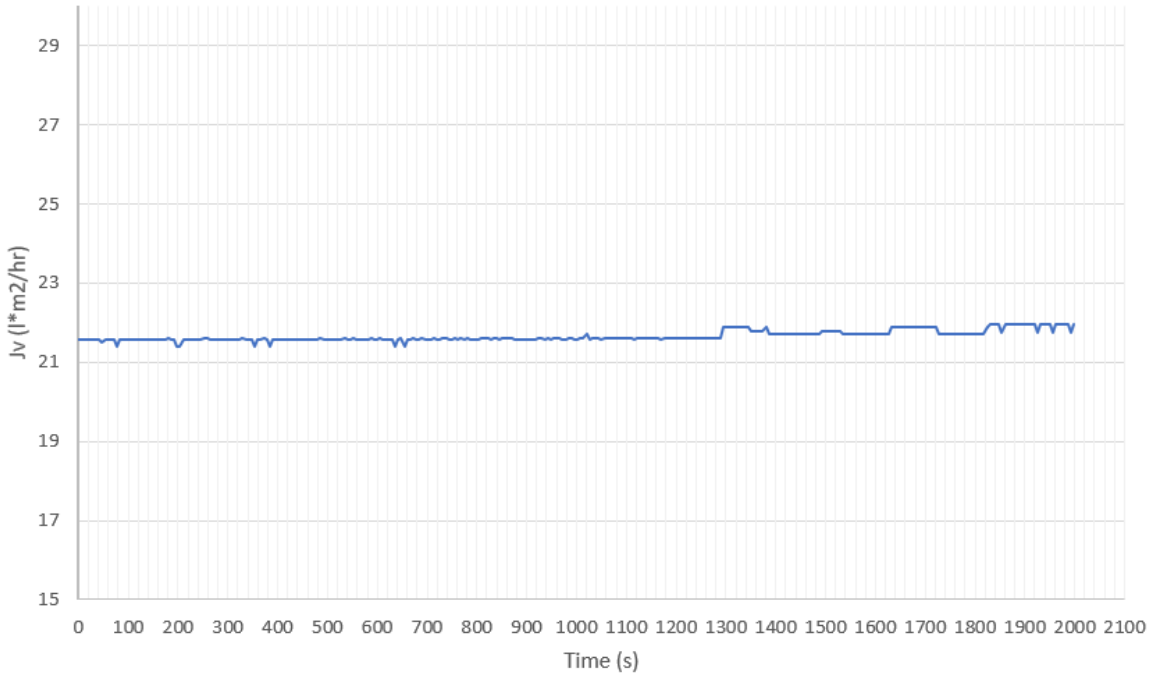

Figure S14: Evolution of Jv for Pb with 7.5 Bar pressure and high concentration

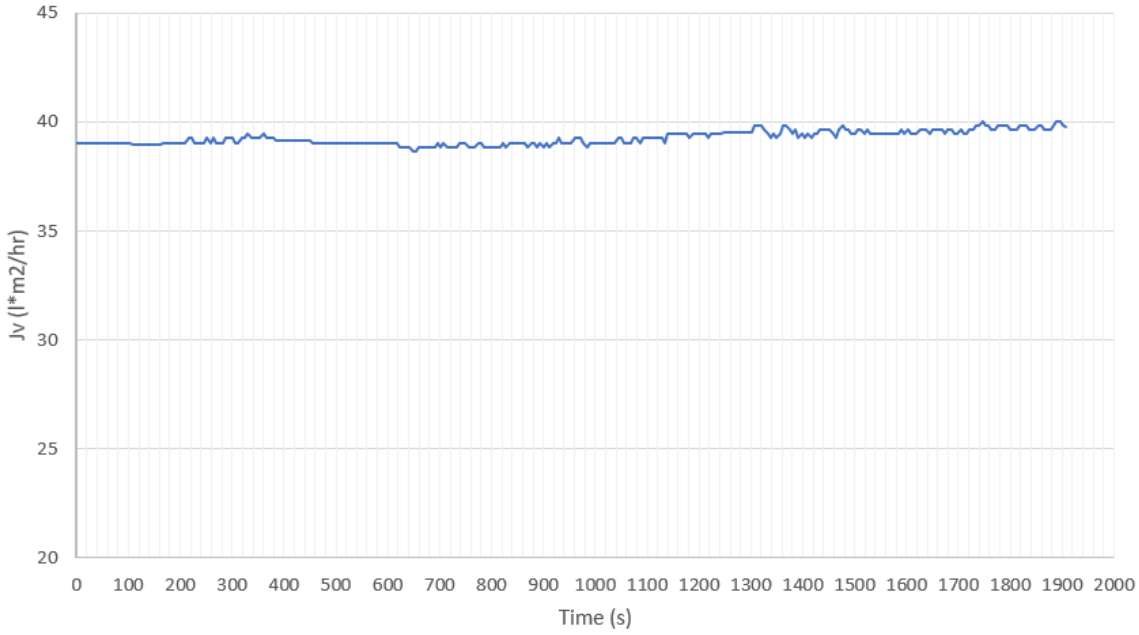

Figure S15: Evolution of Jv for Pb with 10.0 Bar pressure and high concentration

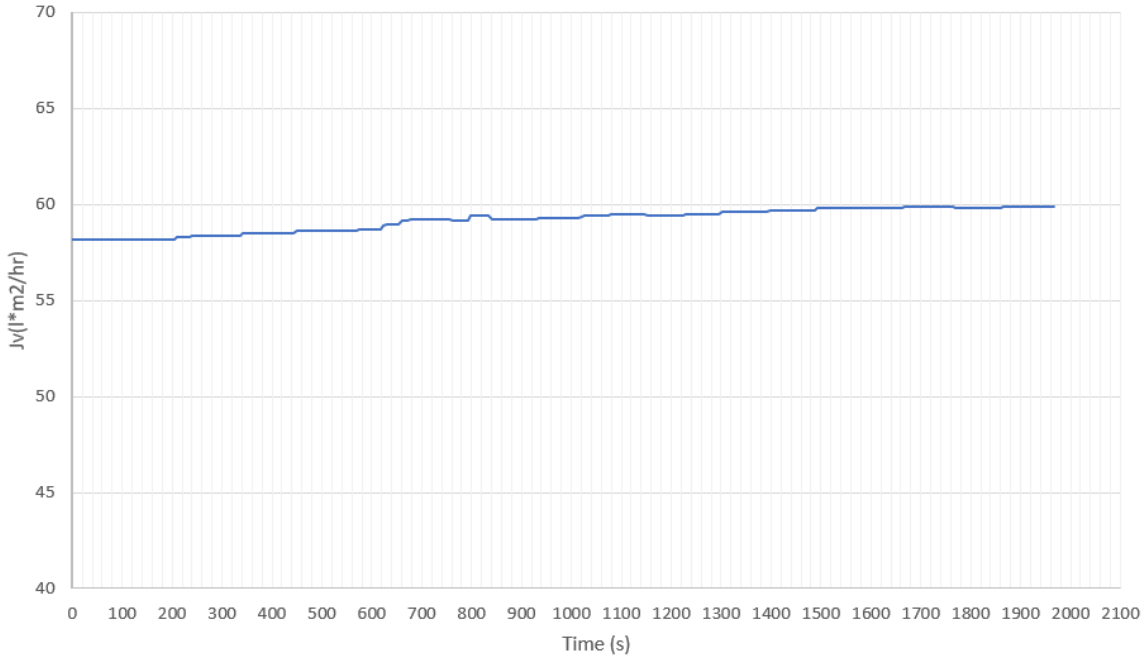

Figure S16: Evolution of Jv for As with 5 Bar pressure and low concentration

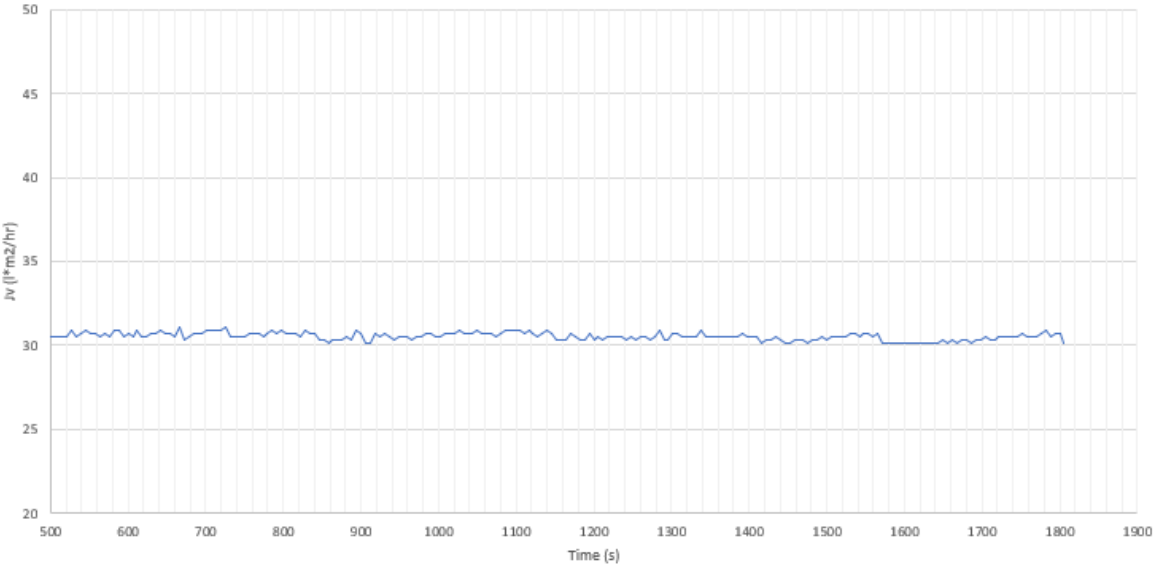

Figure S17: Evolution of Jv for As with 7.5 Bar pressure and low concentration

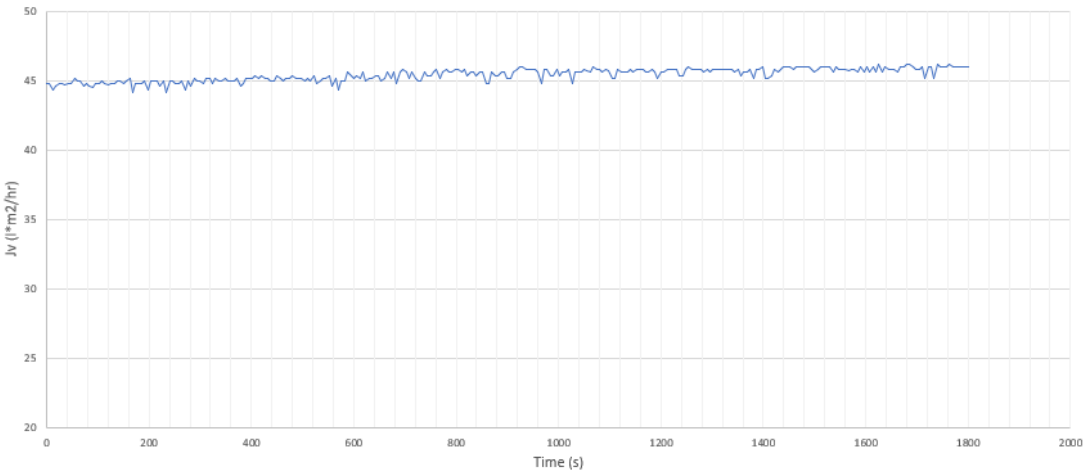

Figure S18: Evolution of Jv for As with 10.0 Bar pressure and low concentration

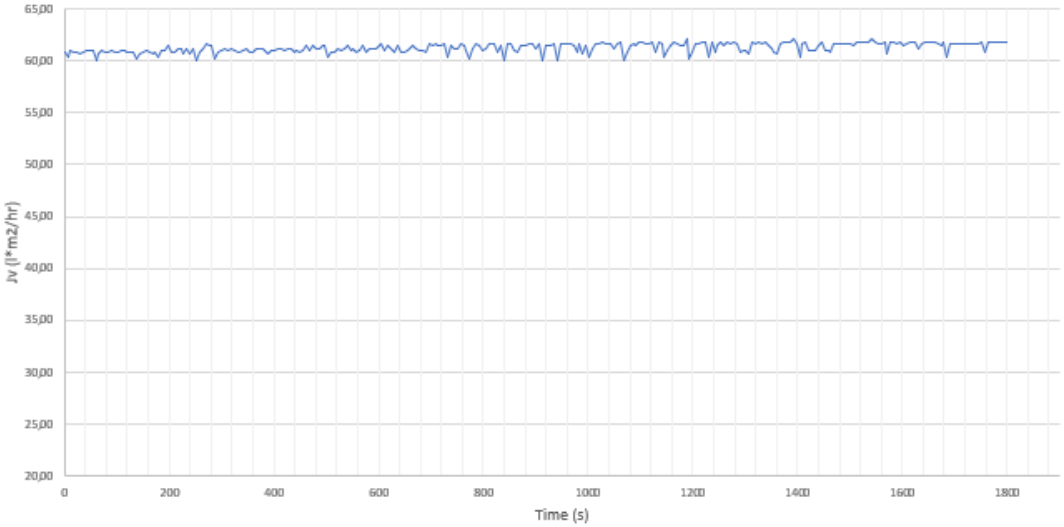

Figure S19: Evolution of Jv for As with 5 Bar pressure and medium concentration

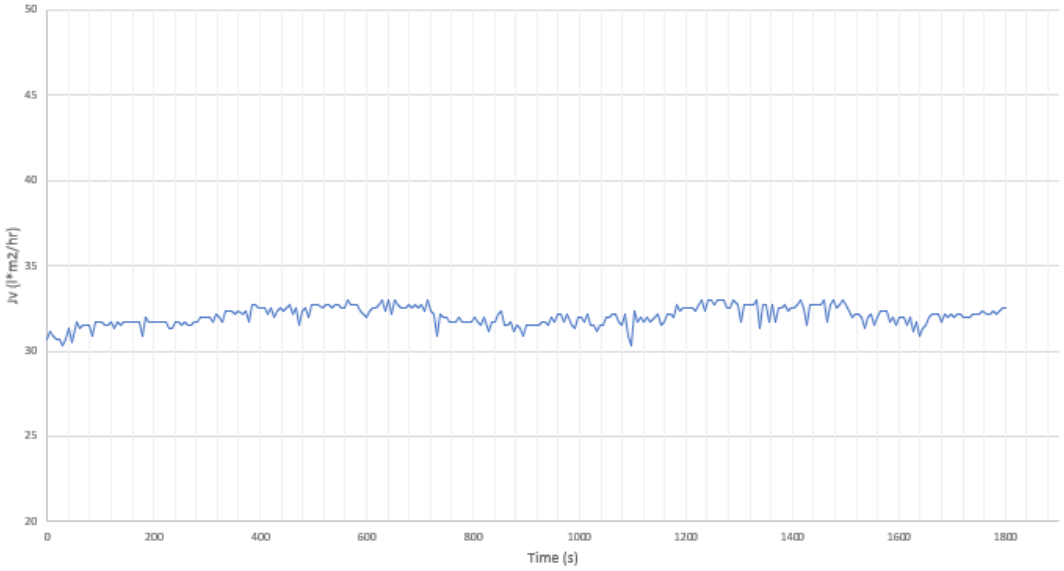

Figure S20: Evolution of Jv for As with 7.5 Bar pressure and medium concentration

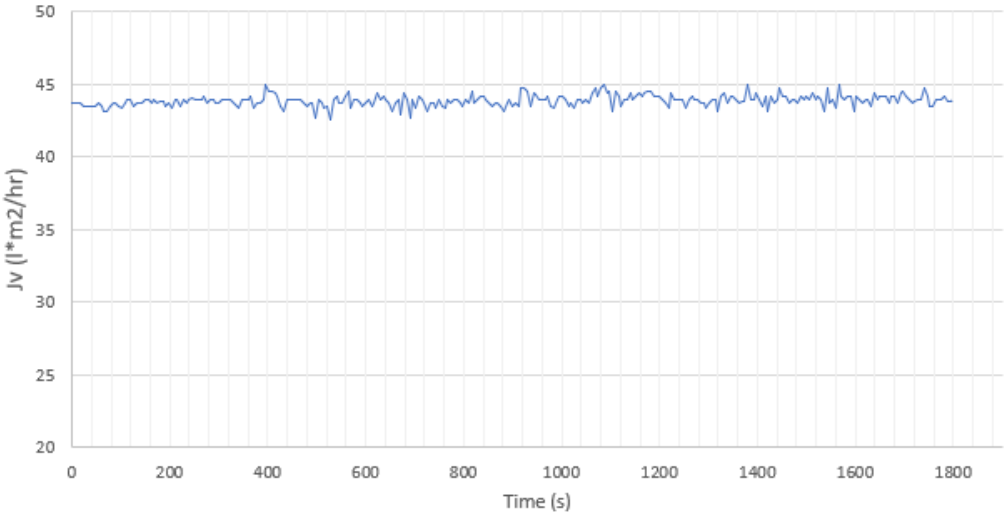

Figure S21: Evolution of Jv for As with 10.0 Bar pressure and medium concentration

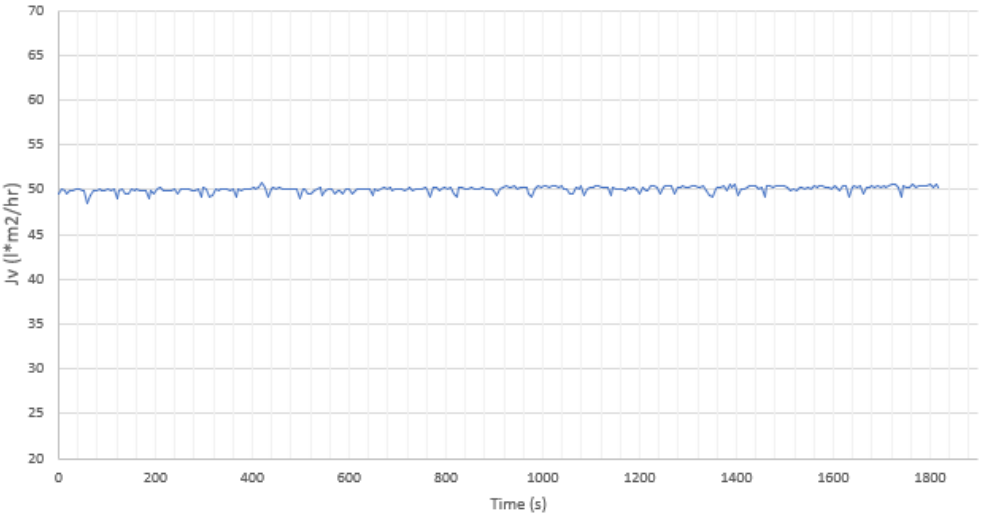

Figure S22: Evolution of Jv for As with 5.0 Bar pressure and high concentration

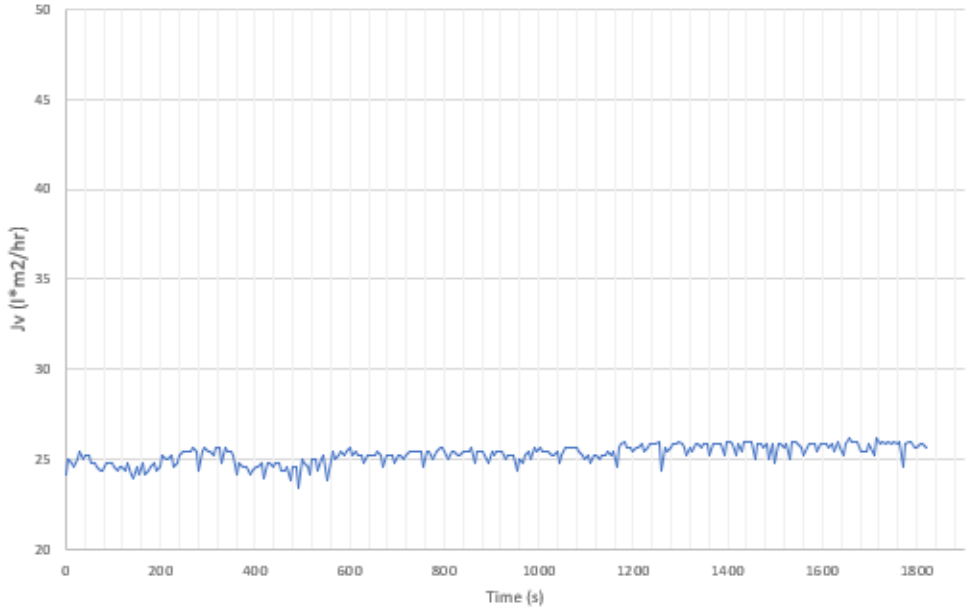

Figure S23: Evolution of Jv for As with 7.5 Bar pressure and high concentration

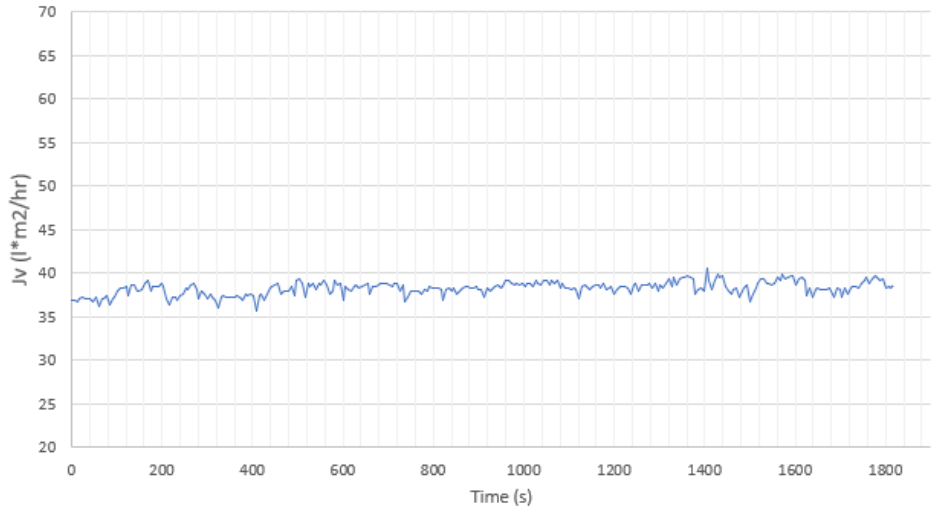

Figure S24: Evolution of Jv for As with 10.0 Bar pressure and high concentration