Electronic Supplementary Information

Proton coupled electron transfer from Co_3O_4 nanoparticles to photogenerated $Ru(bpy)_3^{3+}$: base catalysis and buffer effect.

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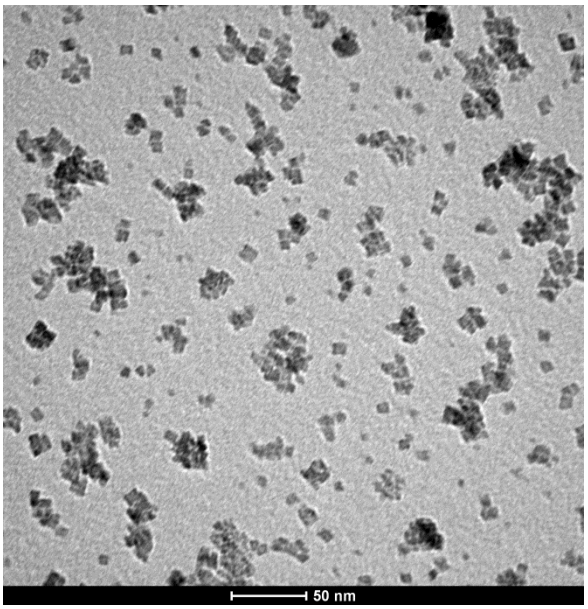


Figure S1. Transmission Electron Microscopy image of cubic Co_3O_4 NPs. Average NP size: 5±1 nm.

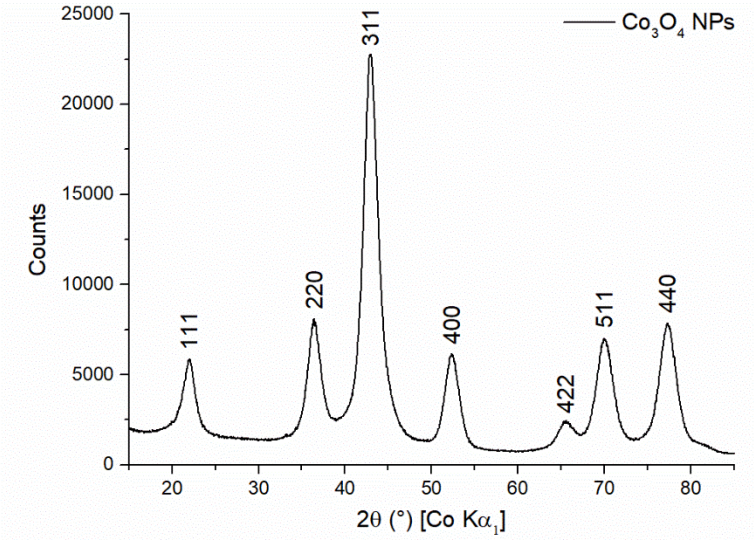


Figure S2. Powder X-ray diffraction pattern of Co_3O_4 NPs: cubic spinel structure, F d -3 m space group. Source: Co $K\alpha_1$ (λ = 1.788965 Å).

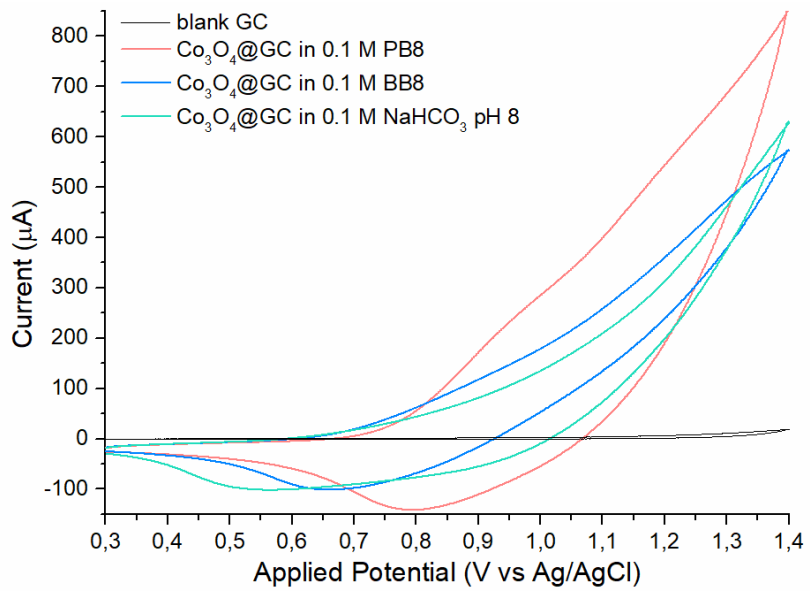


Figure S3. Cyclic voltammetry for Co_3O_4 NPs deposited onto glassy carbon, performed at pH 8 in different buffers. Working electrode: Glassy carbon (0.07 cm^2); counter electrode: Pt (0.02 cm^2); reference electrode: Ag/AgCl (3M NaCl); scan rate: 100 mV/s.

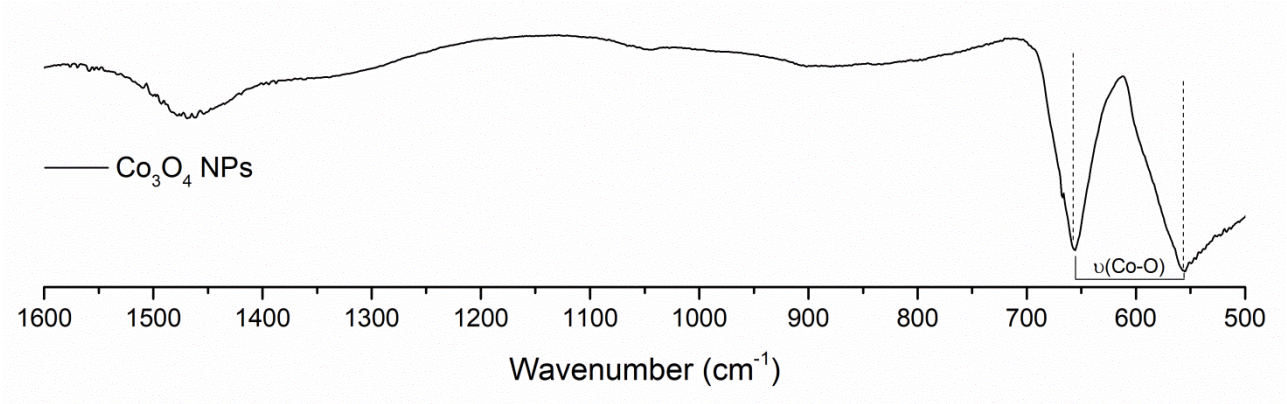


Figure S4. ATR-IR of Co_3O_4 NPs.

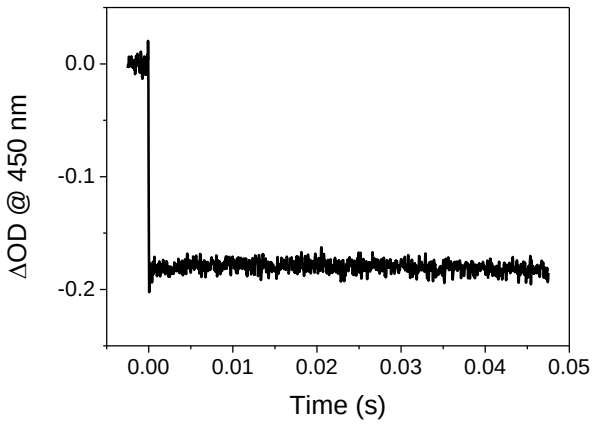


Figure S5. Laser flash photolysis (λ_{exc} = 355 nm) of 50 μM $Ru(bpy)_3^{2+}$ in the presence of 5 mM $Na_2S_2O_8$ and 100 μM $CoFe_2O_4$ NPs in 10 mM borate buffer at pH 8.

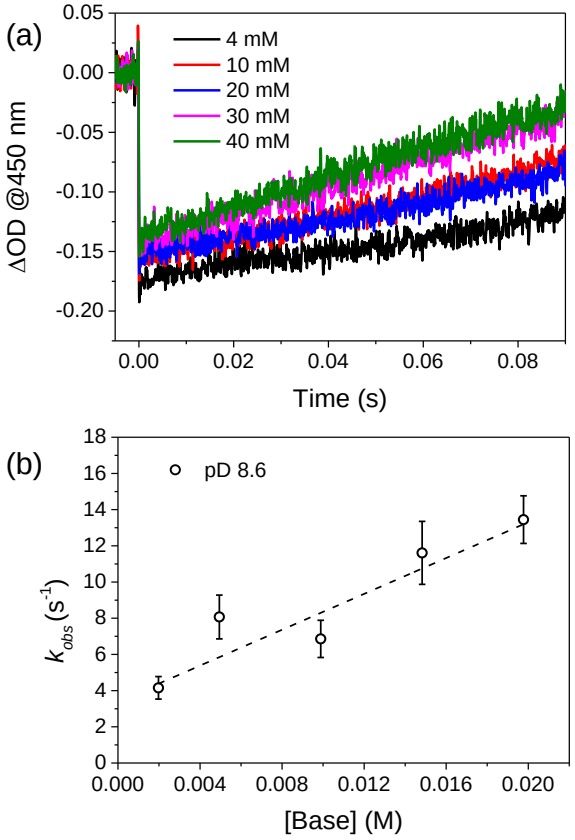


Figure S6. (a) Laser flash photolysis (λ_{exc} = 355 nm) of 50 μM $Ru(bpy)_3^{2+}$ in the presence of 5 mM $Na_2S_2O_8$ and 100 μM Co_3O_4 NPs in 4-30 mM borate buffer at pD 8.6. (b) plot of k_{obs} vs [Base].

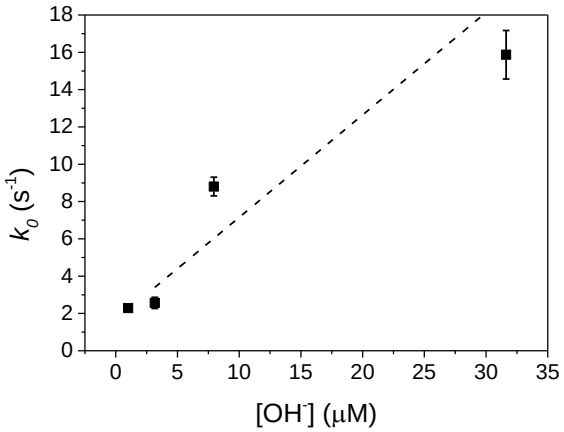


Figure S7. Plot of k_0 vs [OH^-]. See table 1 in the main text for k_0 values, determined from flash photolysis experiments in borate buffer, pH 8.0 – 9.5.

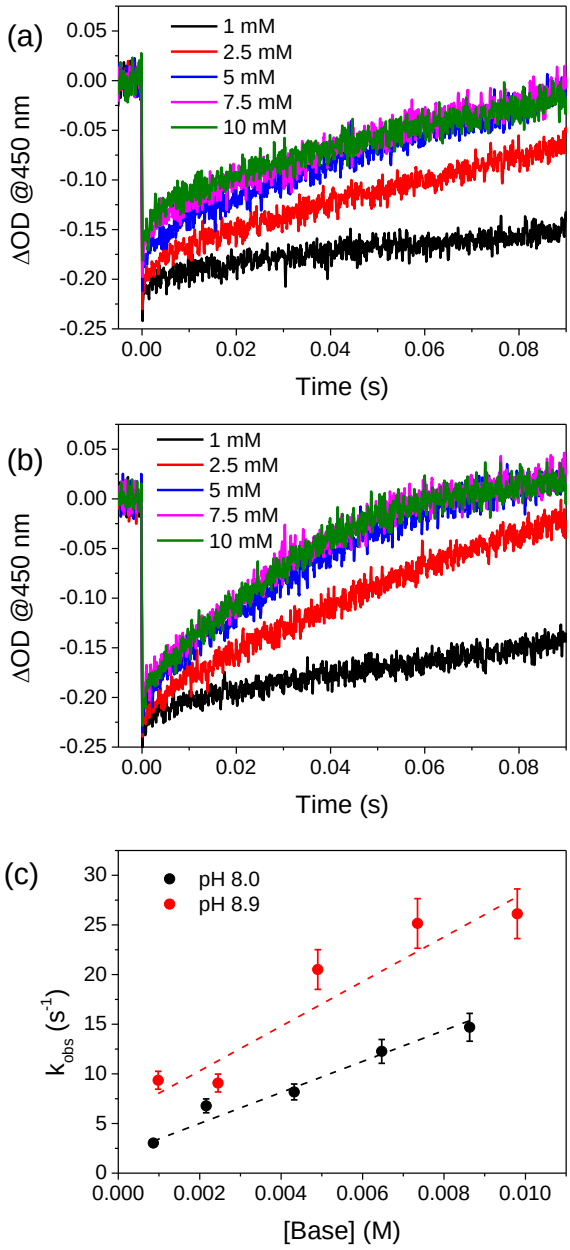


Figure S8. (a) laser flash photolysis (λ_{exc} = 355 nm) of 50 μM $Ru(bpy)_3^{2+}$ in the presence of 5 mM $Na_2S_2O_8$ and 100 μM Co_3O_4 NPs in 1-10 mM phosphate buffer at pH 8.0. (b) Laser flash photolysis (λ_{exc} = 355 nm) of 50 μM $Ru(bpy)_3^{2+}$ in the presence of 5 mM $Na_2S_2O_8$ and 100 μM Co_3O_4 NPs in 1-10 mM phosphate buffer at pH 8.9. (c) Plot of k_{obs} vs [Base].

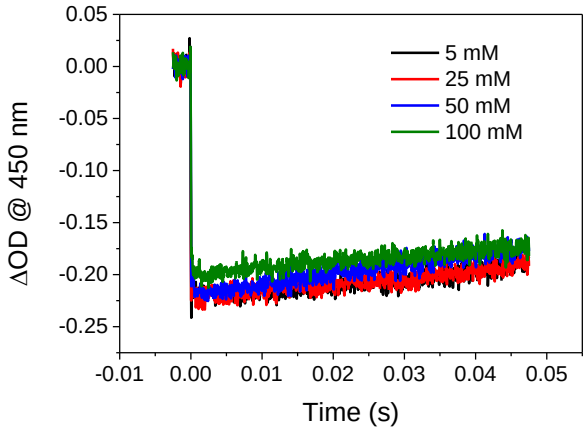


Figure S9. Laser flash photolysis (λ_{exc} = 355 nm) of 50 μM $Ru(bpy)_3^{2+}$ in the presence of 5 mM $Na_2S_2O_8$ and 100 μM Co_3O_4 NPs at pH 8.0, in 5-100 mM carbonate buffer.

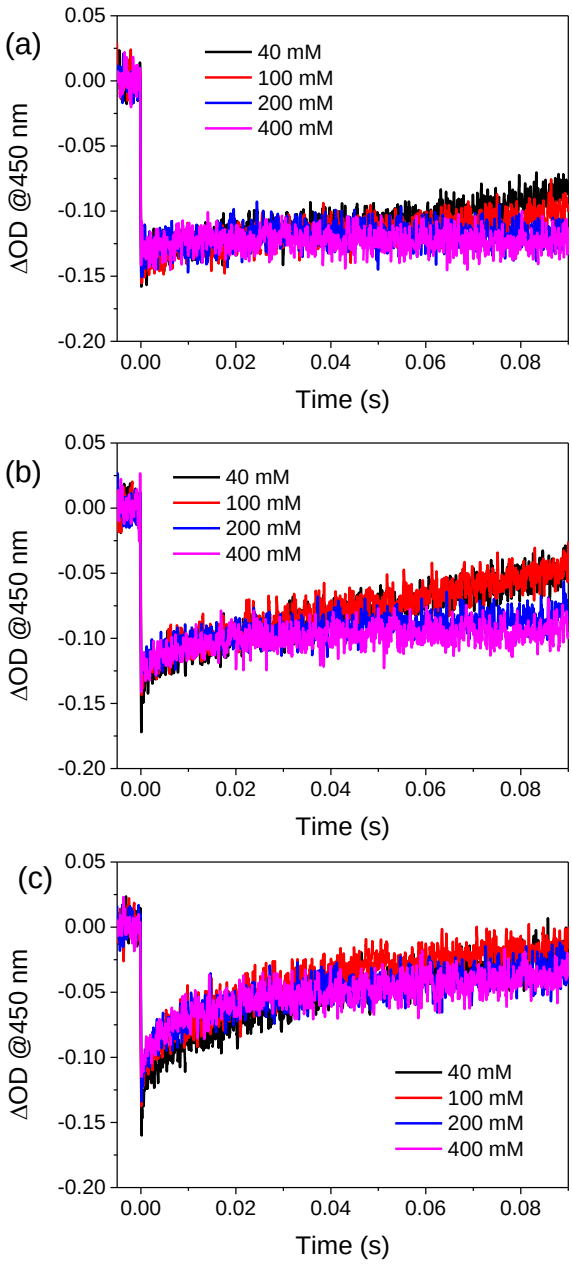


Figure S10. Laser flash photolysis (λ_{exc} = 355 nm) of 50 μM $Ru(bpy)_3^{2+}$ in the presence of 5 mM $Na_2S_2O_8$ and 100 μM Co_3O_4 NPs at: (a) pH 8.0, in 40-400 mM borate buffer; (b) pH 8.5, in 40-400 mM borate buffer; (c) pH 8.9, in 40-400 mM borate buffer.

Table S1. Ru(III) lifetime (τ) and associated kinetic rate constants (*k*) for the flash photolysis experiments conducted at different pH and borate buffer concentration. For the sake of comparison, τ (and derived *k* values) are reported from: (i) experimentally determination at half recovery of the ΔOD^{450} in the experimental traces (values used in the discussion in the main text) and (ii) from mono or bi-exponential fittings. Bi-exponential fittings converged into a monoexponential fitting, unless in the cases indicated by footnote (b). Uncertainty in the τ values determined at the half recovery of the ΔOD traces is estimated as 10 or 15% of the value; uncertainty in the τ values determined by exponential fitting is provided by the fitting (see traces below).

	Determined at the half recovery of the ΔOD traces		Determined from exponential fittings	
buffer	τ (s)	k_{obs} (s^{-1})	τ (s)	k_{obs} (s^{-1})
Borate, pH 8				
4 mM	0.254±0.038 [(a)]	2.73±0.41	0.284±0.004	2.44±0.04
10 mM	0.186±0.028 [(a)]	3.72±0.56	0.217±0.003	3.19±0.04
20 mM	0.147±0.022 [(a)]	4.71±0.71	0.163±0.002	4.25±0.05
30 mM	0.160±0.024	4.33±0.65	0.183±0.003	3.79±0.06
40 mM	0.151±0.023	4.59±0.69	0.162±0.002	4.28±0.05
100 mM	0.218±0.033	3.18±0.48	0.244±0.004	2.84±0.05
200 mM	1.280±0.190	0.54±0.08	-	-
400 mM	-	-	-	-
Borate, pH 8.5				
4 mM	0.191±0.029 [(a)]	3.63±0.54	0.222±0.004	3.12±0.04
10 mM	0.121±0.018 [(a)]	5.73±0.86	0.131±0.002	5.29±0.05
20 mM	0.083±0.012	8.35±1.25	0.082±0.001	8.45±0.10
30 mM	0.066±0.010	10.5±1.6	0.073±0.001	9.49±0.13
40 mM	0.059±0.009	11.7±1.8	0.070±0.001	9.90±0.13
100 mM	0.065±0.009	10.7±1.6	0.072±0.001	9.63±0.13
200 mM	0.184±0.028	3.77±0.56	0.217±0.004	3.19±0.06
400 mM	0.326±0.049	2.12±0.32	0.372±0.006	1.86±0.03
Borate, pH 8.9				
4 mM	0.058±0.006	11.9±1.2	0.0621±0.0006	11.16±0.11
10 mM	0.053±0.005	13.1±1.3	0.0558±0.0005 [(b)]	12.42±0.11
20 mM	0.034±0.003	20.4±2.0	0.0390±0.0004 [(b)]	17.77±0.20
30 mM	0.026±0.003	26.7±2.7	0.0413±0.0004 [(b)]	16.78±0.17
40 mM	0.020±0.002	34.7±3.5	0.0341±0.0004 [(b)]	20.32±0.18
100 mM	0.016±0.002	43.3±4.3	0.0284±0.0003 [(b)]	24.41±0.23
200 mM	0.020±0.002	35.0±3.5	0.054±0.001 [(b)]	12.83±0.22
400 mM	0.023±0.002	30.1±3.0	0.074±0.001 [(b)]	9.37±0.13
Borate, pH 9.5				
4 mM	0.037±0.004	18.7±1.9	0.0295±0.0002	23.41±0.16
10 mM	0.033±0.003	21.0±2.1	0.0266±0.0002	26.06±0.20
20 mM	0.022±0.002	30.9±3.1	0.0192±0.0002	36.10±0.38
30 mM	0.020±0.002	33.6±3.4	0.0166±0.0002	41.76±0.51
40 mM	0.017±0.002	40.8±4.1	0.0133±0.0002	52.12±0.76
100 mM	0.012±0.001	58.8±5.9	0.0100±0.0001	69.31±0.69
200 mM	0.029±0.003	23.5±2.3	0.0333±0.0002	20.81±0.12
400 mM	0.040±0.004	17.3±1.7	0.0919±0.001	7.54±0.58

[(a)]determined from a linear fitting of the traces; [(b)]determined from a weighted average of the two τ values from a bi-exponential fitting.

Table S2. Kinetic rate constants for PCET from Co_3O_4 NPs to $Ru(III)(bpy)_3^{3+}$ in flash photolysis experiments in borate buffer, determined from: (i) experimentally determination at half recovery of the ΔOD^{450} in the experimental traces (values used in the discussion in the main text) and (ii) from mono or bi-exponential fittings, see Table S1.

	Determined plotting k_{obs} (determined at the half recovery of the ΔOD traces)		Determined plotting k_{obs} (from exponential fittings)	
pH	k_0 (s^{-1})	$k_B/100$ ($M^{-1}s^{-1}$)	k_0 (s^{-1})	$k_B/100$ ($M^{-1}s^{-1}$)
8.0	2.3±0.2	6.3±0.9	2.0±0.1	5.6±0.3
8.5	2.6±0.2	6.3±0.5	2.6±0.8	5.7±0.9
8.9	8.8±0.5	8.5±1.2	10.4±2.0	4.0±1.8
9.5	15.9±1.1	7.0±0.7	19.0±1.0	8.8±0.4

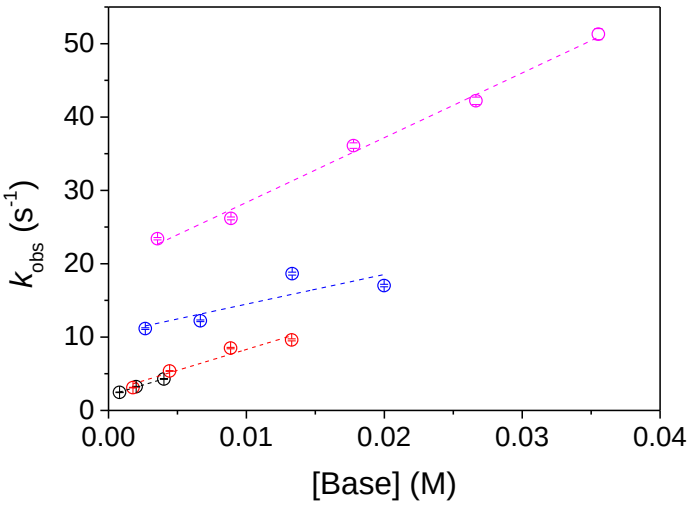
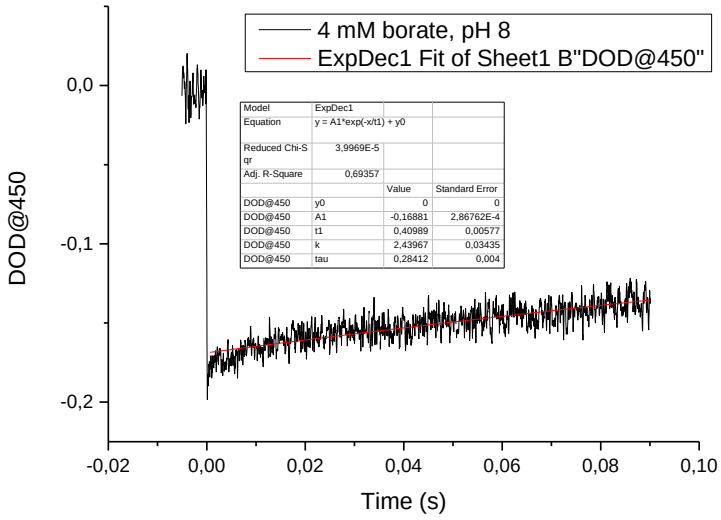


Figure S11. Plot of k_{obs} (from exponential fittings) vs. [Base], where Base is $B(OH)_4^-$, and the concentrations are given by $[Base]=f_B \times [buffer]$, where f_B is the fraction of the basic form of the buffer in solution, and [buffer] is the total buffer concentration; pK_a for the $H_3BO_3/B(OH)_4^-$ couple = 8.6.


4 mM borate, pH 8
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Model ExpDec1
Equation y = A1*exp(-x/t1) + y0
Reduced Chi-Sqr 3,9969E-5
Adj. R-Square 0,69357
Value Standard Error
DOD@450 y0 0 0
DOD@450 A1 -0,16881 2,86762E-4
DOD@450 t1 0,40989 0,00577
DOD@450 k 2,43967 0,03435
DOD@450 tau 0,28412 0,004
DOD@450
Time (s)
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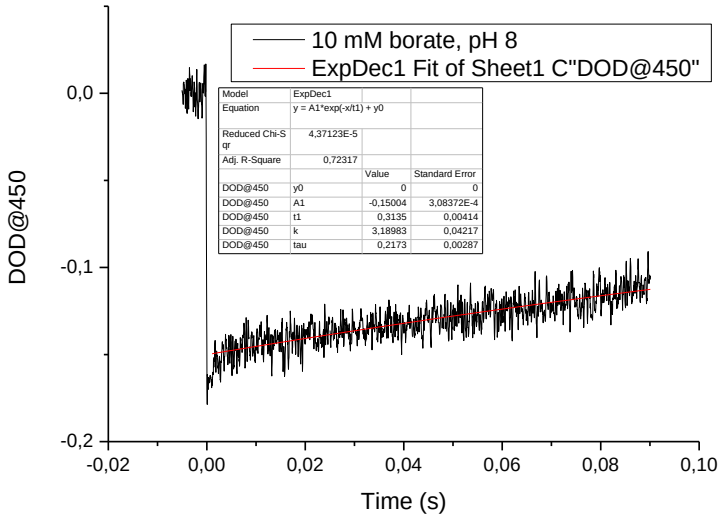
-0,02
0,00
0,02
0,04
0,06
0,08
0,10


10 mM borate, pH 8
ExpDec1 Fit of Sheet1 C"DOD@450"
Model ExpDec1
Equation y = A1*exp(-x/t1) + y0
Reduced Chi-Sqr 4,37123E-5
Adj. R-Square 0,72317
Value Standard Error
DOD@450 y0 0 0
DOD@450 A1 -0,15004 3,08372E-4
DOD@450 t1 0,3135 0,00414
DOD@450 k 3,18983 0,04217
DOD@450 tau 0,2173 0,00287
DOD@450
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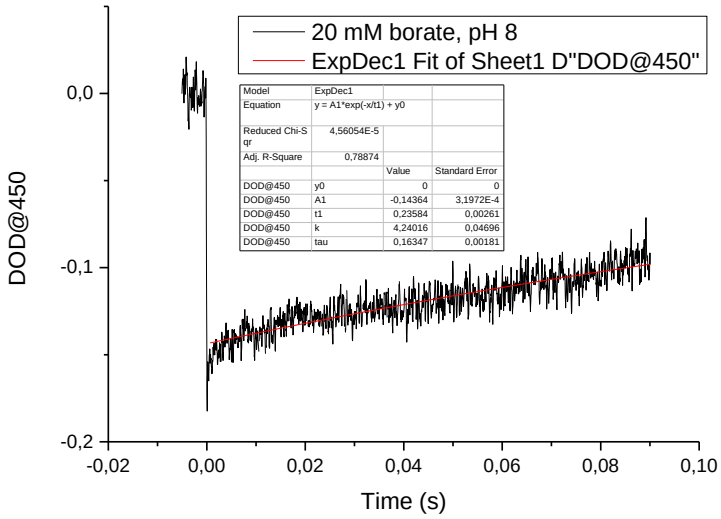
0,02
0,04
0,06
0,08
0,10


20 mM borate, pH 8
ExpDec1 Fit of Sheet1 D"DOD@450"
Model ExpDec1
Equation y = A1*exp(-x/t1) + y0
Reduced Chi-Sqr 4,56054E-5
Adj. R-Square 0,78874
Value Standard Error
DOD@450 y0 0 0
DOD@450 A1 -0,14364 3,1972E-4
DOD@450 t1 0,23584 0,00261
DOD@450 k 4,24016 0,04696
DOD@450 tau 0,16347 0,00181
DOD@450
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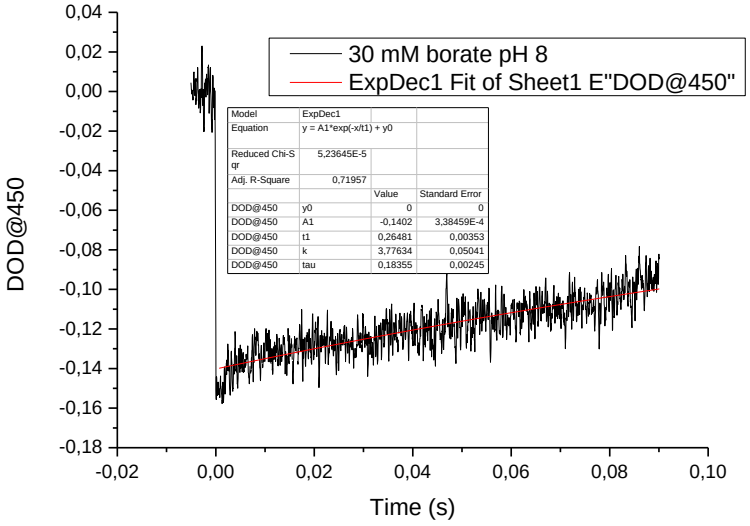
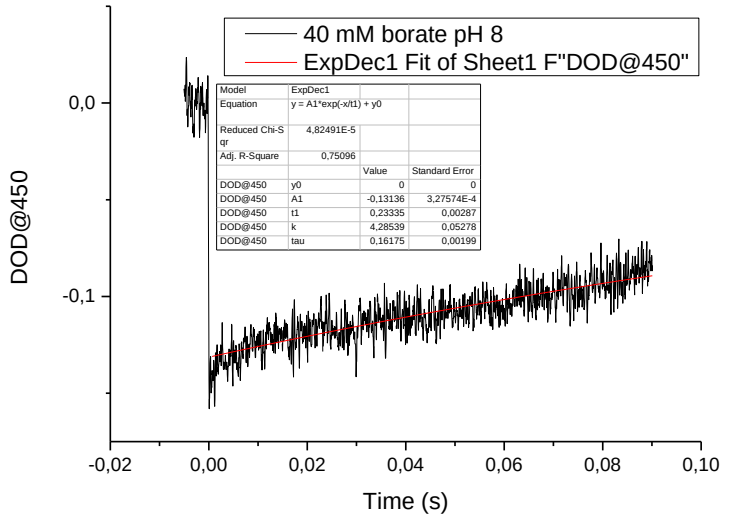
-0,02
0,00
0,02
0,04
0,06
0,08
0,10



Model	ExpDec1		
Equation	y = A1*exp(-x/t1) + y0		
Reduced Chi-Sqr	5,23645E-5		
Adj. R-Square	0,71957		
		Value	Standard Error
DOD@450	y0	0	0
DOD@450	A1	-0,1402	3,38459E-4
DOD@450	t1	0,26481	0,00353
DOD@450	k	3,77634	0,05041
DOD@450	tau	0,18355	0,00245



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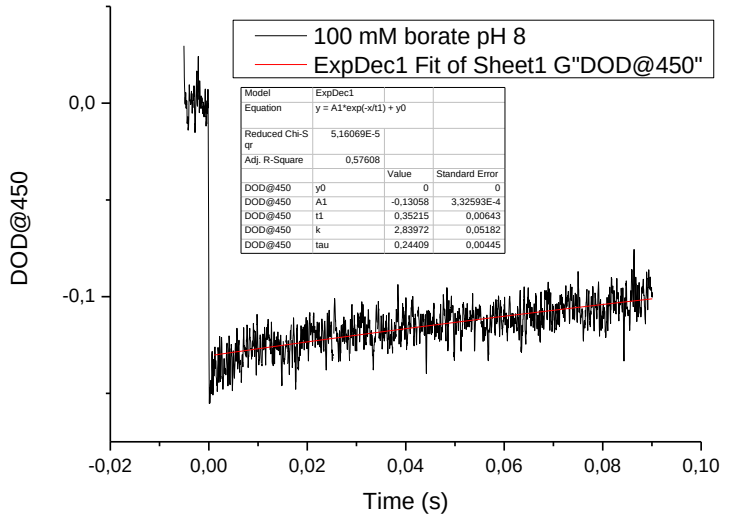
Equation	y = A1*exp(-x/t1) + y0		
Reduced Chi-Sqr	4,82491E-5		
Adj. R-Square	0,75096		
		Value	Standard Error
DOD@450	y0	0	0
DOD@450	A1	-0,13136	3,27574E-4
DOD@450	t1	0,23335	0,00287
DOD@450	k	4,28539	0,05278
DOD@450	tau	0,16175	0,00199



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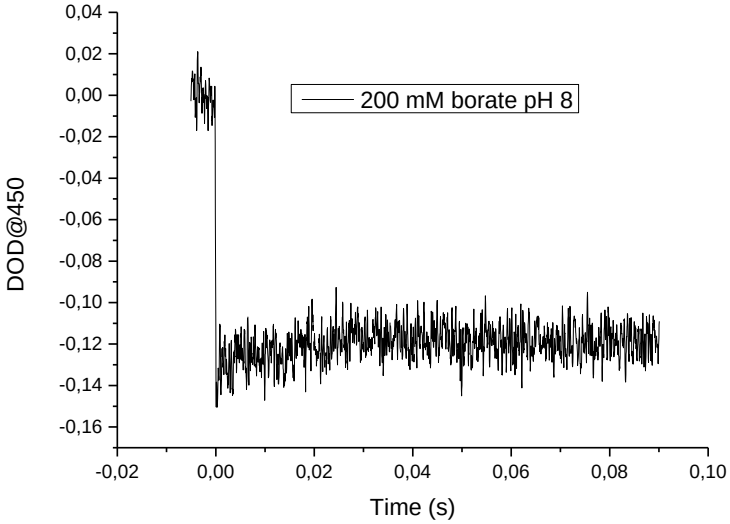
Equation	y = A1*exp(-x/t1) + y0		
Reduced Chi-Sqr	5,16069E-5		
Adj. R-Square	0,57608		
		Value	Standard Error
DOD@450	y0	0	0
DOD@450	A1	-0,13058	3,32593E-4
DOD@450	t1	0,35215	0,00643
DOD@450	k	2,83972	0,05182
DOD@450	tau	0,24409	0,00445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-0,02
0,00
0,02
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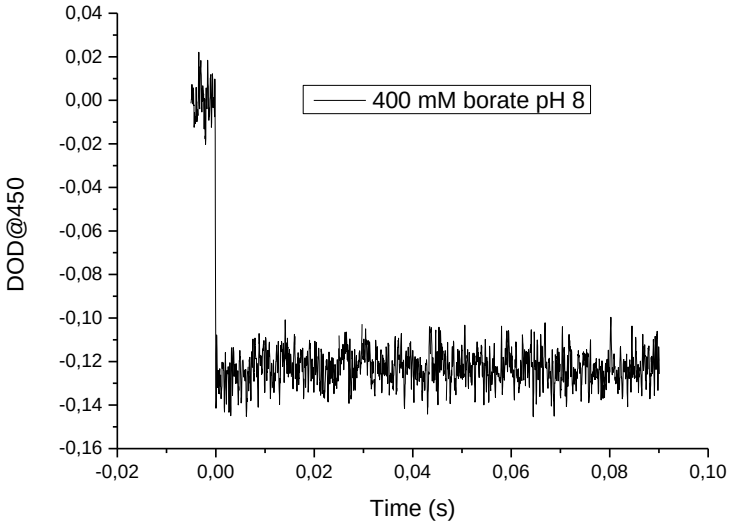
400 mM borate pH 8
DOD@450
Time (s)
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-0,08
-0,10
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0,02
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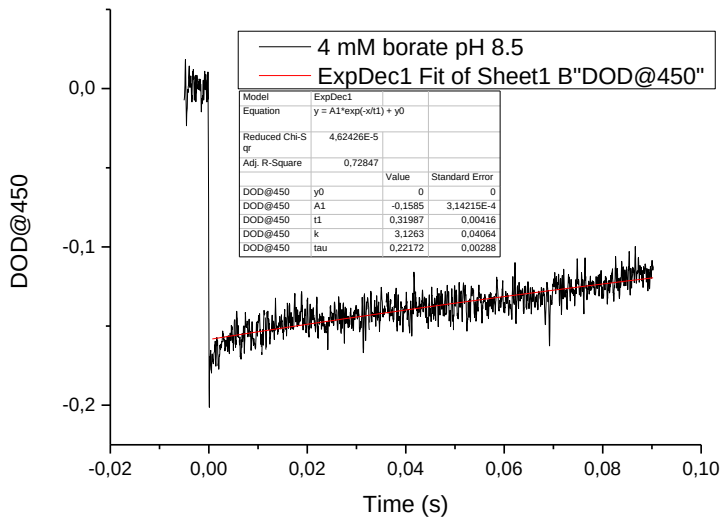
0,10


4 mM borate pH 8.5
ExpDec1 Fit of Sheet1 B"DOD@450"
Model ExpDec1
Equation y = A1*exp(-x/t1) + y0
Reduced Chi-Sqr 4,62426E-5
Adj. R-Square 0,72847
Value Standard Error
DOD@450 y0 0 0
DOD@450 A1 -0,1585 3,14215E-4
DOD@450 t1 0,31987 0,00416
DOD@450 k 3,1263 0,04064
DOD@450 tau 0,22172 0,00288
DOD@450
Time (s)
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0,08
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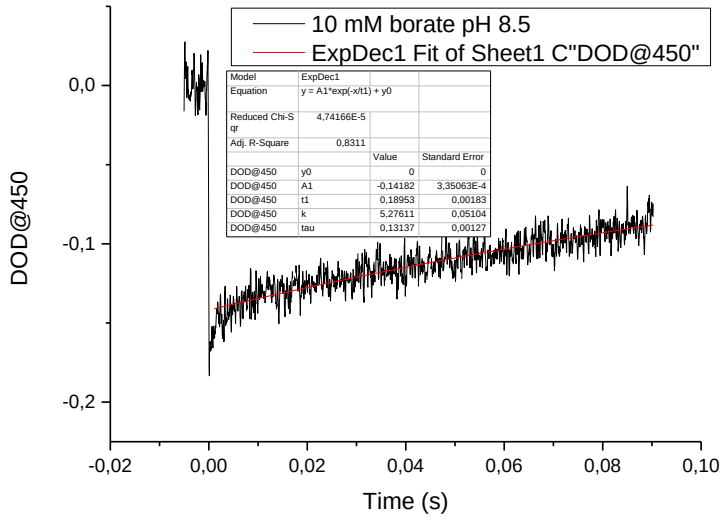
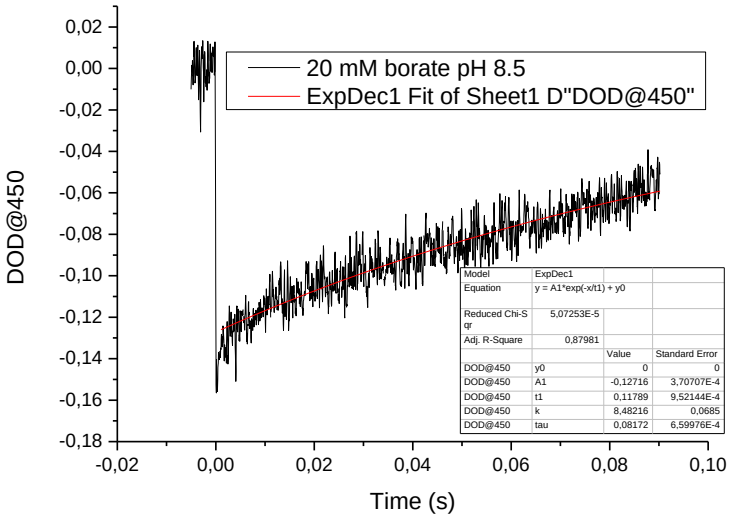


Model	ExpDec1		
Equation	y = A1*exp(-x/t1) + y0		
Reduced Chi-Sqr	4,74166E-5		
Adj. R-Square	0,8311		
		Value	Standard Error
DOD@450	y0	0	0
DOD@450	A1	-0,14182	3,35063E-4
DOD@450	t1	0,18953	0,00183
DOD@450	k	5,27611	0,05104
DOD@450	tau	0,13137	0,00127



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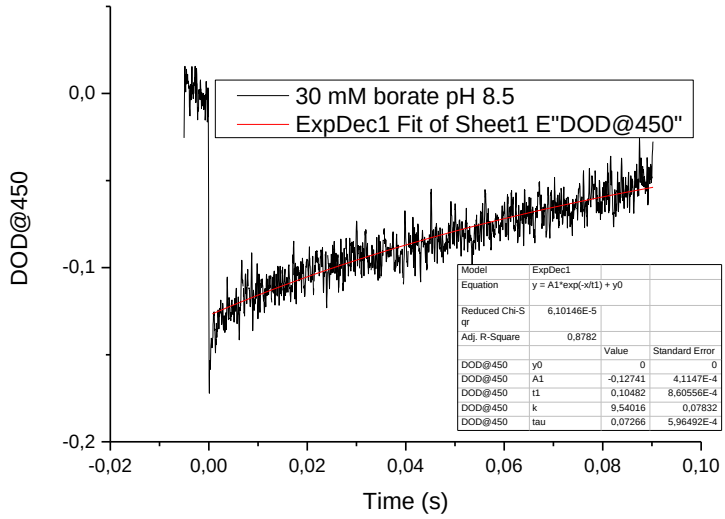
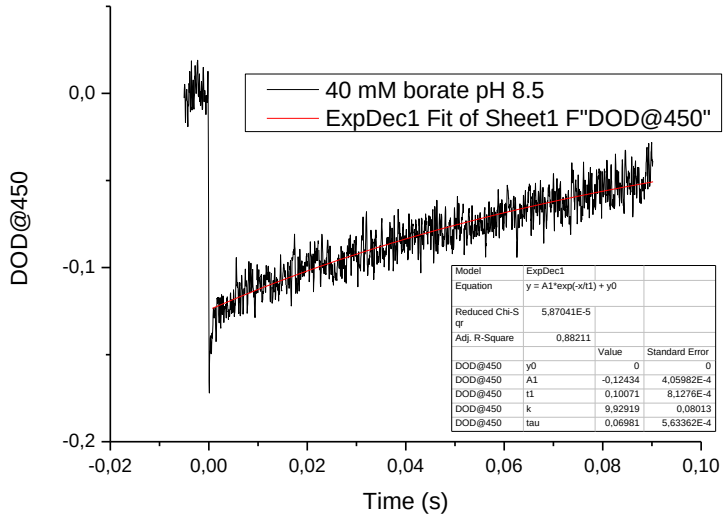
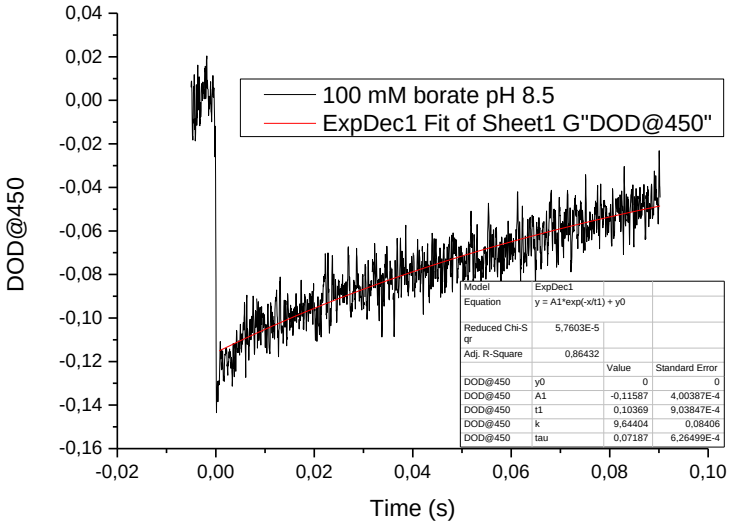
Equation	y = A1*exp(-x/t1) + y0		
Reduced Chi-Sqr	5,07253E-5		
Adj. R-Square	0,87981		
		Value	Standard Error
DOD@450	y0	0	0
DOD@450	A1	-0,12716	3,70707E-4
DOD@450	t1	0,11789	9,52144E-4
DOD@450	k	8,48216	0,0685
DOD@450	tau	0,08172	6,59976E-4



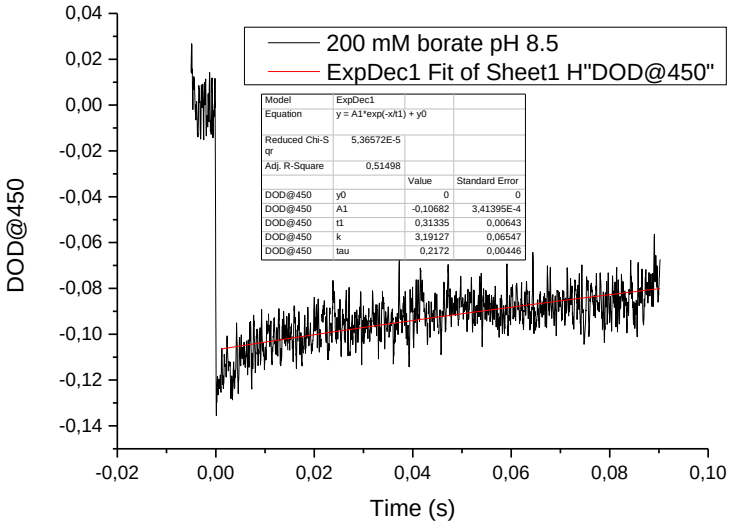
Model	ExpDec1		
Equation	y = A1*exp(-x/t1) + y0		
Reduced Chi-Sqr	6,10146E-5		
Adj. R-Square	0,8782		
		Value	Standard Error
DOD@450	y0	0	0
DOD@450	A1	-0,12741	4,1147E-4
DOD@450	t1	0,10482	8,60556E-4
DOD@450	k	9,54016	0,07832
DOD@450	tau	0,07266	5,96492E-4



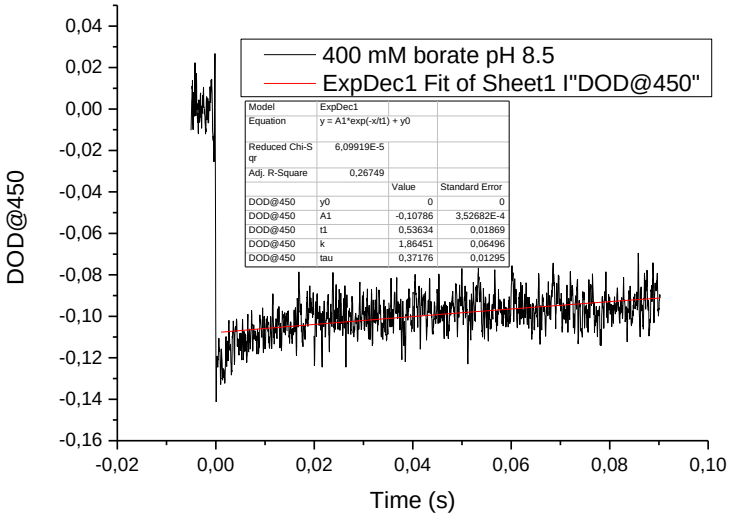
Model	ExpDec1		
Equation	y = A1*exp(-x/t1) + y0		
Reduced Chi-Sqr	5,87041E-5		
Adj. R-Square	0,88211		
		Value	Standard Error
DOD@450	y0	0	0
DOD@450	A1	-0,12434	4,05982E-4
DOD@450	t1	0,10071	8,1276E-4
DOD@450	k	9,92919	0,08013
DOD@450	tau	0,06981	5,63362E-4



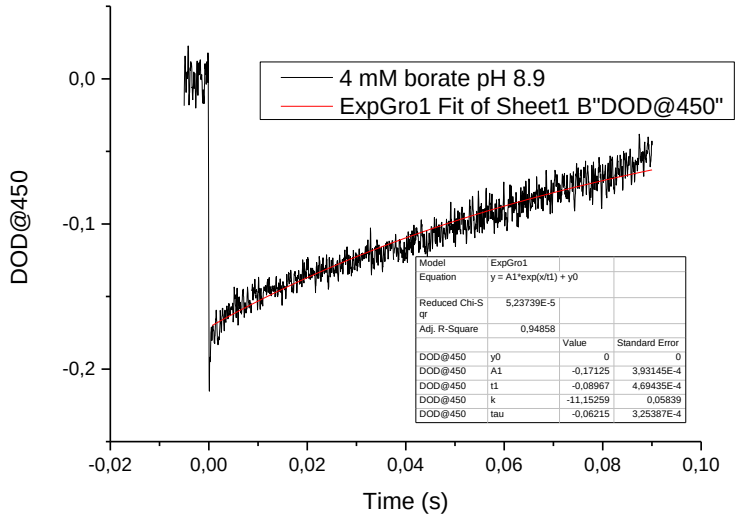
Model	ExpDec1		
Equation	y = A1*exp(-x/t1) + y0		
Reduced Chi-Sqr	5,7603E-5		
Adj. R-Square	0,86432		
		Value	Standard Error
DOD@450	y0	0	0
DOD@450	A1	-0,11587	4,00387E-4
DOD@450	t1	0,10369	9,03847E-4
DOD@450	k	9,64404	0,08406
DOD@450	tau	0,07187	6,26499E-4



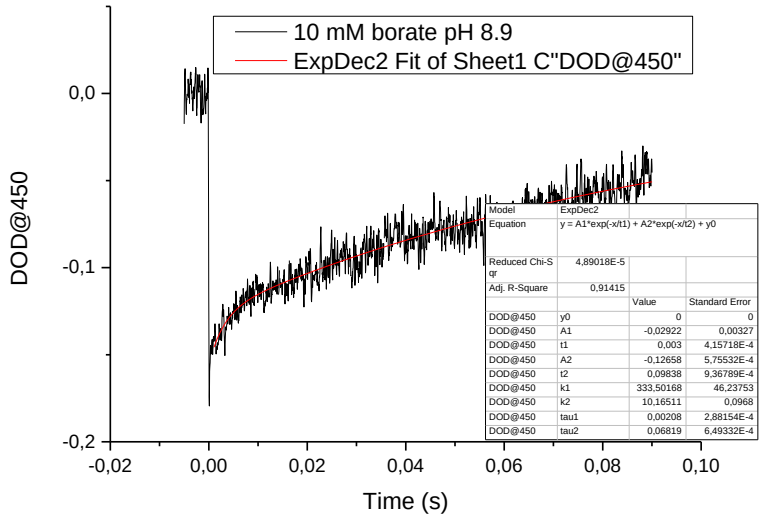
Model	ExpDec1		
Equation	y = A1*exp(-x/t1) + y0		
Reduced Chi-Sqr	5,36572E-5		
Adj. R-Square	0,51498		
		Value	Standard Error
DOD@450	y0	0	0
DOD@450	A1	-0,10682	3,41395E-4
DOD@450	t1	0,31335	0,00643
DOD@450	k	3,19127	0,06547
DOD@450	tau	0,2172	0,00446



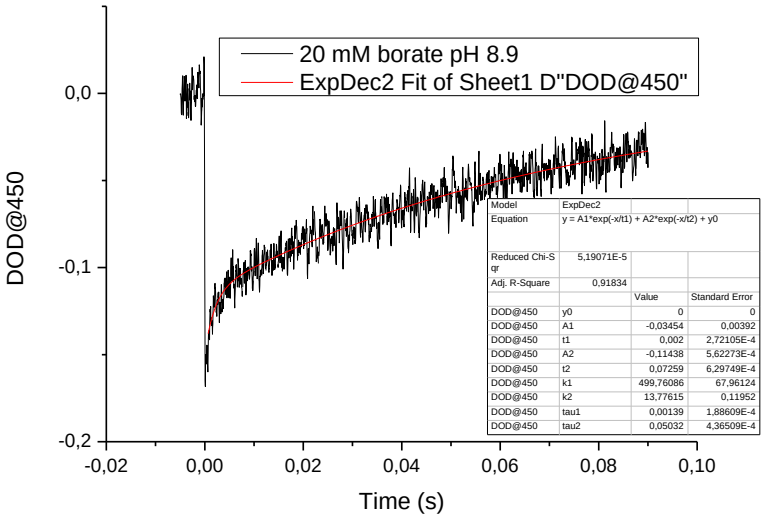
Model	ExpDec1		
Equation	y = A1*exp(-x/t1) + y0		
Reduced Chi-Sqr	6,09919E-5		
Adj. R-Square	0,26749		
		Value	Standard Error
DOD@450	y0	0	0
DOD@450	A1	-0,10786	3,52682E-4
DOD@450	t1	0,53634	0,01869
DOD@450	k	1,86451	0,06496
DOD@450	tau	0,37176	0,01295



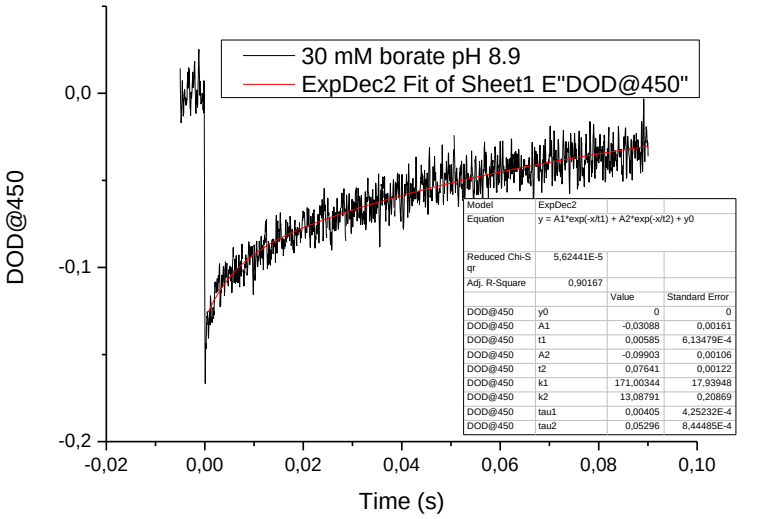
Model	ExpGro1		
Equation	y = A1*exp(x/t1) + y0		
Reduced Chi-Sqr	5,23739E-5		
Adj. R-Square	0,94858		
		Value	Standard Error
DOD@450	y0	0	0
DOD@450	A1	-0,17125	3,93145E-4
DOD@450	t1	-0,08967	4,69435E-4
DOD@450	k	-11,15259	0,05839
DOD@450	tau	-0,06215	3,25387E-4



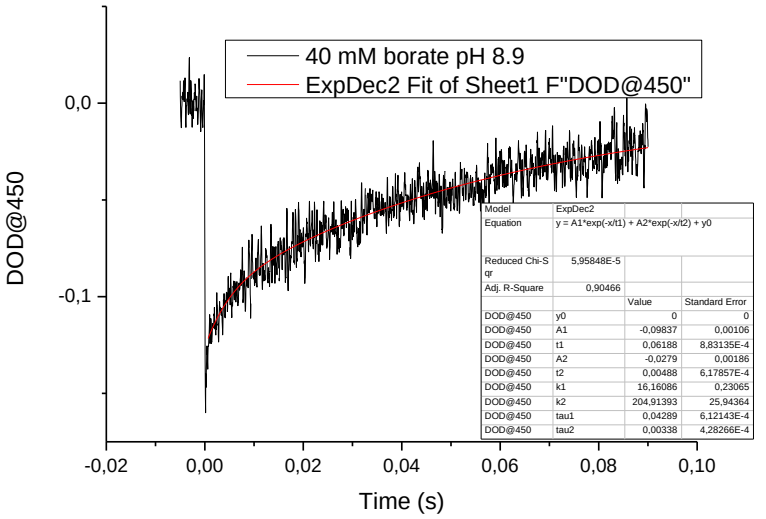
Model	ExpDec2		
Equation	y = A1*exp(-x/t1) + A2*exp(-x/t2) + y0		
Reduced Chi-Sqr	4,89018E-5		
Adj. R-Square	0,91415		
		Value	Standard Error
DOD@450	y0	0	0
DOD@450	A1	-0,02922	0,00327
DOD@450	t1	0,003	4,15718E-4
DOD@450	A2	-0,12658	5,75532E-4
DOD@450	t2	0,09838	9,36789E-4
DOD@450	k1	333,50168	46,23753
DOD@450	k2	10,16511	0,0968
DOD@450	tau1	0,00208	2,88154E-4
DOD@450	tau2	0,06819	6,49332E-4



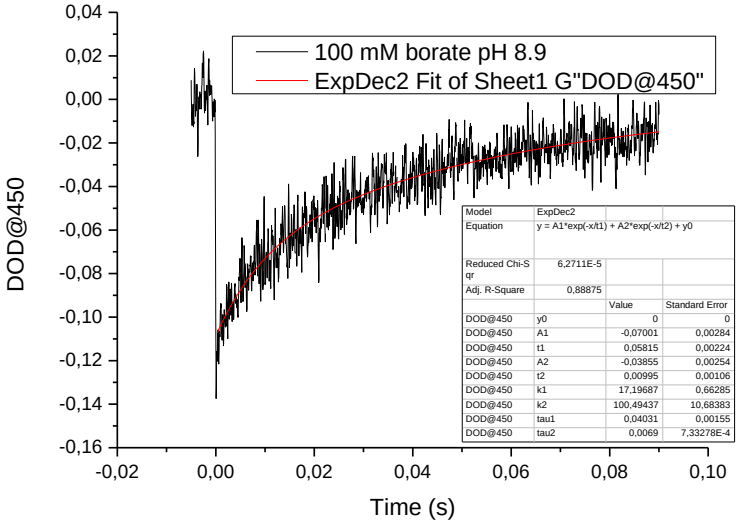
Model	ExpDec2		
Equation	y = A1*exp(-x/t1) + A2*exp(-x/t2) + y0		
Reduced Chi-Sqr	5,19071E-5		
Adj. R-Square	0,91834		
		Value	Standard Error
DOD@450	y0	0	0
DOD@450	A1	-0,03454	0,00392
DOD@450	t1	0,002	2,72105E-4
DOD@450	A2	-0,11438	5,62273E-4
DOD@450	t2	0,07259	6,29749E-4
DOD@450	k1	499,76086	67,96124
DOD@450	k2	13,77615	0,11952
DOD@450	tau1	0,00139	1,88609E-4
DOD@450	tau2	0,05032	4,36509E-4



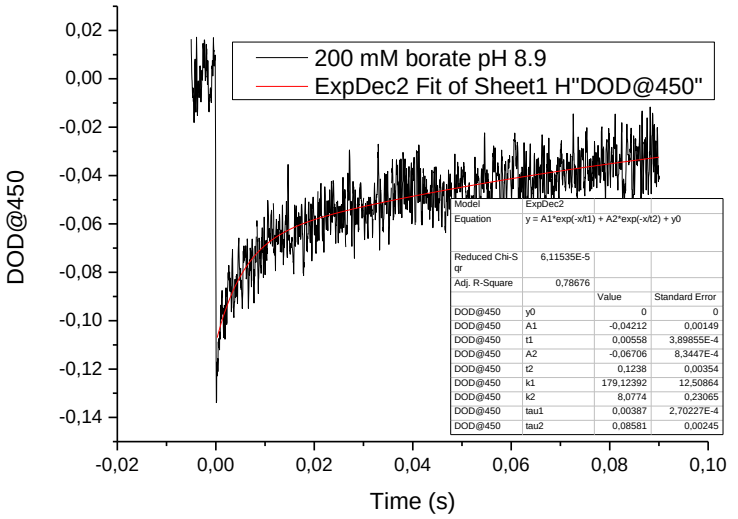
Model	ExpDec2		
Equation	y = A1*exp(-x/t1) + A2*exp(-x/t2) + y0		
Reduced Chi-Sqr	5,62441E-5		
Adj. R-Square	0,90167		
		Value	Standard Error
DOD@450	y0	0	0
DOD@450	A1	-0,03088	0,00161
DOD@450	t1	0,00585	6,13479E-4
DOD@450	A2	-0,09903	0,00106
DOD@450	t2	0,07641	0,00122
DOD@450	k1	171,00344	17,93948
DOD@450	k2	13,08791	0,20869
DOD@450	tau1	0,00405	4,25232E-4
DOD@450	tau2	0,05296	8,44485E-4



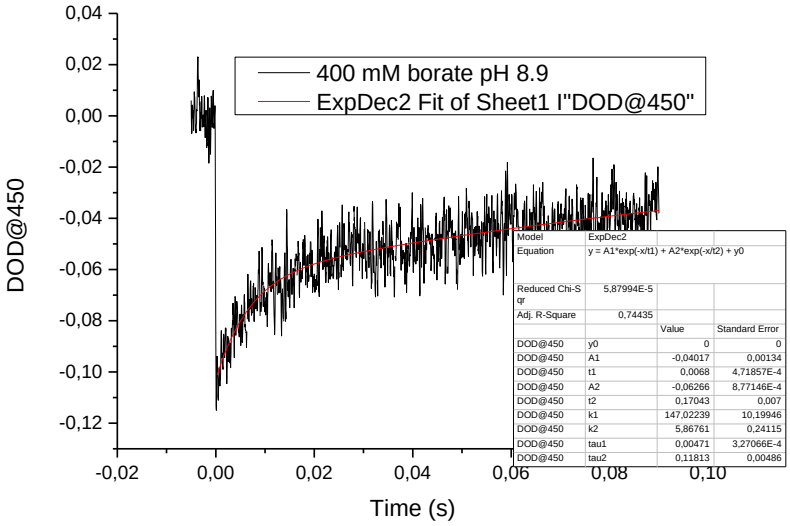
Model	ExpDec2		
Equation	y = A1*exp(-x/t1) + A2*exp(-x/t2) + y0		
Reduced Chi-Sqr	5,95848E-5		
Adj. R-Square	0,90466		
		Value	Standard Error
DOD@450	y0	0	0
DOD@450	A1	-0,09837	0,00106
DOD@450	t1	0,06188	8,83135E-4
DOD@450	A2	-0,0279	0,00186
DOD@450	t2	0,00488	6,17857E-4
DOD@450	k1	16,16086	0,23065
DOD@450	k2	204,91393	25,94364
DOD@450	tau1	0,04289	6,12143E-4
DOD@450	tau2	0,00338	4,28266E-4



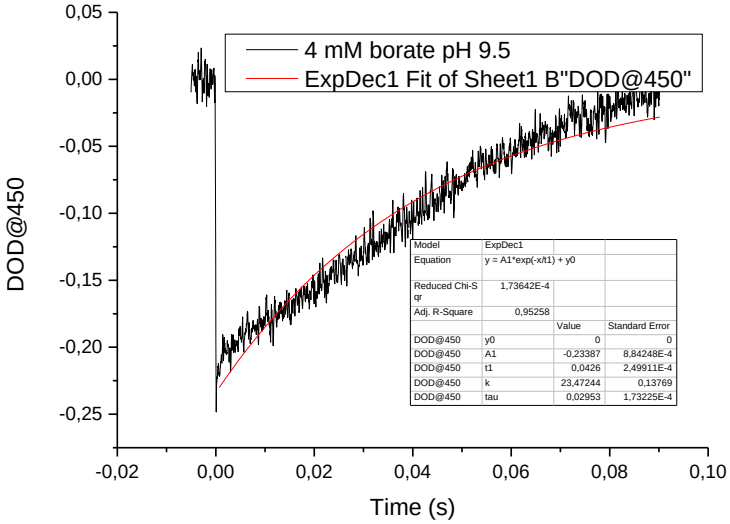
Model	ExpDec2		
Equation	y = A1*exp(-x/t1) + A2*exp(-x/t2) + y0		
Reduced Chi-Sqr	6,2711E-5		
Adj. R-Square	0,88875		
		Value	Standard Error
DOD@450	y0	0	0
DOD@450	A1	-0,07001	0,00284
DOD@450	t1	0,05815	0,00224
DOD@450	A2	-0,03855	0,00254
DOD@450	t2	0,00995	0,00106
DOD@450	k1	17,19687	0,66285
DOD@450	k2	100,49437	10,68383
DOD@450	tau1	0,04031	0,00155
DOD@450	tau2	0,0069	7,33278E-4



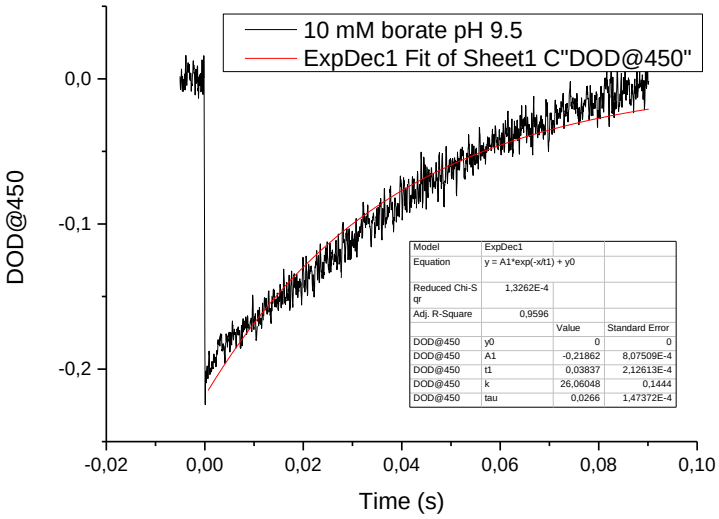
Model	ExpDec2		
Equation	y = A1*exp(-x/t1) + A2*exp(-x/t2) + y0		
Reduced Chi-Sqr	6,11535E-5		
Adj. R-Square	0,78676		
		Value	Standard Error
DOD@450	y0	0	0
DOD@450	A1	-0,04212	0,00149
DOD@450	t1	0,00558	3,89855E-4
DOD@450	A2	-0,06706	8,3447E-4
DOD@450	t2	0,1238	0,00354
DOD@450	k1	179,12392	12,50864
DOD@450	k2	8,0774	0,23065
DOD@450	tau1	0,00387	2,70227E-4
DOD@450	tau2	0,08581	0,00245



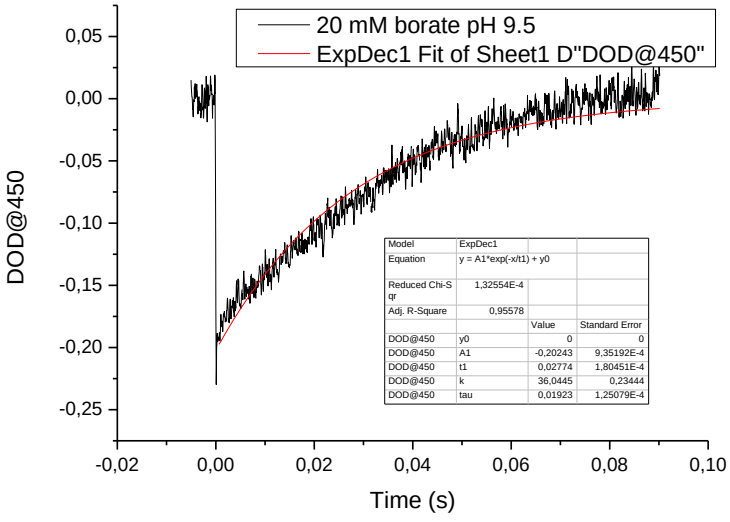
Model	ExpDec2		
Equation	y = A1*exp(-x/t1) + A2*exp(-x/t2) + y0		
Reduced Chi-Sqr	5,87994E-5		
Adj. R-Square	0,74435		
		Value	Standard Error
DOD@450	y0	0	0
DOD@450	A1	-0,04017	0,00134
DOD@450	t1	0,0068	4,71857E-4
DOD@450	A2	-0,06266	8,77146E-4
DOD@450	t2	0,17043	0,007
DOD@450	k1	147,02239	10,19946
DOD@450	k2	5,86761	0,24115
DOD@450	tau1	0,00471	3,27066E-4
DOD@450	tau2	0,11813	0,00486



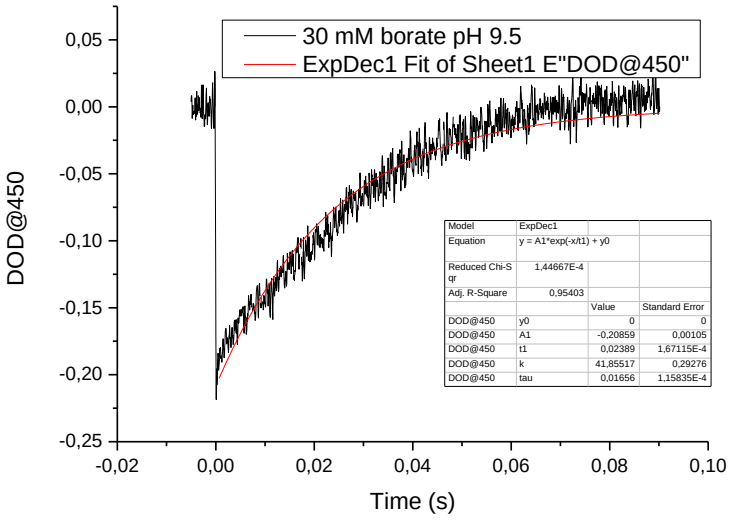
Model	ExpDec1		
Equation	y = A1*exp(-x/t1) + y0		
Reduced Chi-Sqr	1,73642E-4		
Adj. R-Square	0,95258		
		Value	Standard Error
DOD@450	y0	0	0
DOD@450	A1	-0,23387	8,84248E-4
DOD@450	t1	0,0426	2,49911E-4
DOD@450	k	23,47244	0,13769
DOD@450	tau	0,02953	1,73225E-4



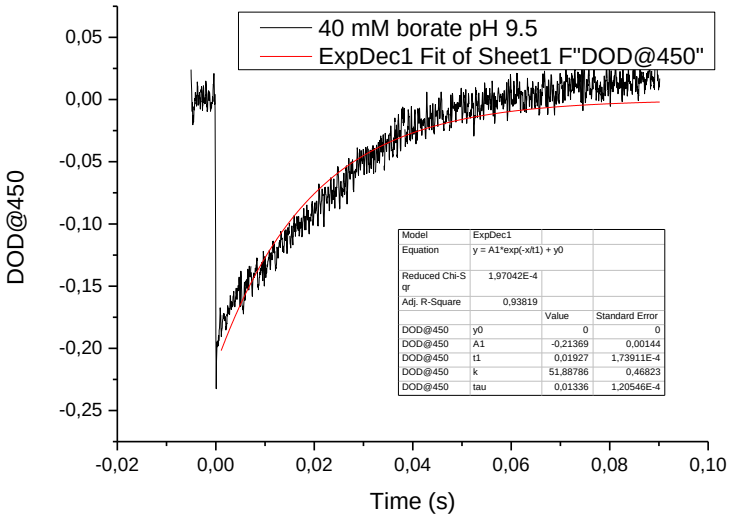
Model	ExpDec1		
Equation	y = A1*exp(-x/t1) + y0		
Reduced Chi-Sqr	1,3262E-4		
Adj. R-Square	0,9596		
		Value	Standard Error
DOD@450	y0	0	0
DOD@450	A1	-0,21862	8,07509E-4
DOD@450	t1	0,03837	2,12613E-4
DOD@450	k	26,06048	0,1444
DOD@450	tau	0,0266	1,47372E-4



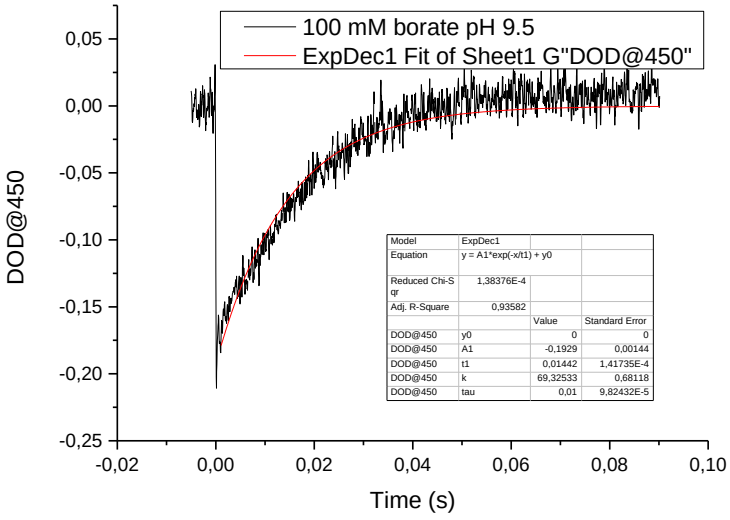
Model	ExpDec1		
Equation	y = A1*exp(-x/t1) + y0		
Reduced Chi-Sqr	1,32554E-4		
Adj. R-Square	0,95578		
		Value	Standard Error
DOD@450	y0	0	0
DOD@450	A1	-0,20243	9,35192E-4
DOD@450	t1	0,02774	1,80451E-4
DOD@450	k	36,0445	0,23444
DOD@450	tau	0,01923	1,25079E-4



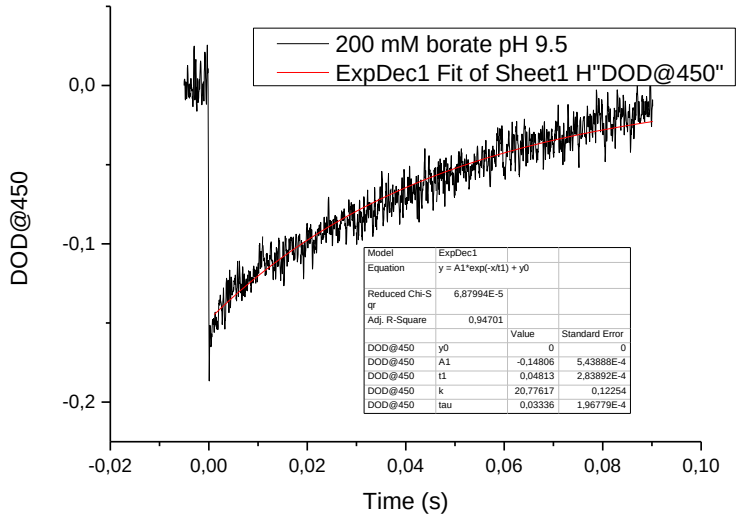
Model	ExpDec1		
Equation	y = A1*exp(-x/t1) + y0		
Reduced Chi-Sqr	1,44667E-4		
Adj. R-Square	0,95403		
		Value	Standard Error
DOD@450	y0	0	0
DOD@450	A1	-0,20859	0,00105
DOD@450	t1	0,02389	1,67115E-4
DOD@450	k	41,85517	0,29276
DOD@450	tau	0,01656	1,15835E-4



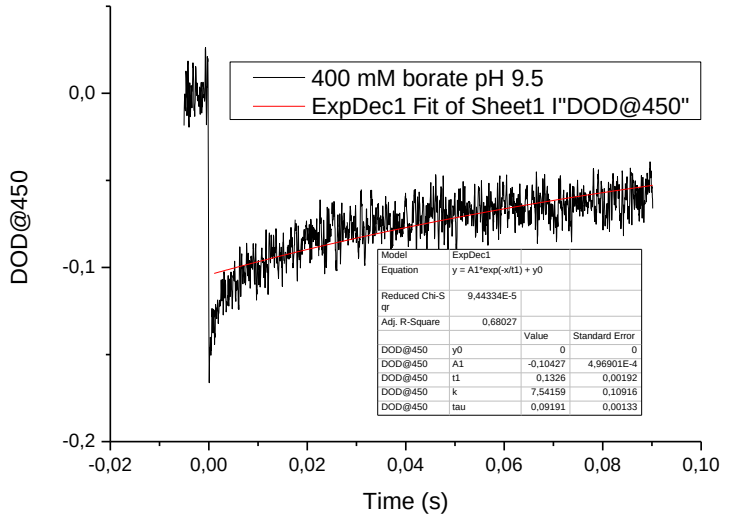
Model	ExpDec1		
Equation	y = A1*exp(-x/t1) + y0		
Reduced Chi-Sqr	1,97042E-4		
Adj. R-Square	0,93819		
		Value	Standard Error
DOD@450	y0	0	0
DOD@450	A1	-0,21369	0,00144
DOD@450	t1	0,01927	1,73911E-4
DOD@450	k	51,88786	0,46823
DOD@450	tau	0,01336	1,20546E-4



Model	ExpDec1		
Equation	y = A1*exp(-x/t1) + y0		
Reduced Chi-Sqr	1,38376E-4		
Adj. R-Square	0,93582		
		Value	Standard Error
DOD@450	y0	0	0
DOD@450	A1	-0,1929	0,00144
DOD@450	t1	0,01442	1,41735E-4
DOD@450	k	69,32533	0,68118
DOD@450	tau	0,01	9,82432E-5



Model	ExpDec1		
Equation	y = A1*exp(-x/t1) + y0		
Reduced Chi-Sqr	6,87994E-5		
Adj. R-Square	0,94701		
		Value	Standard Error
DOD@450	y0	0	0
DOD@450	A1	-0,14806	5,43888E-4
DOD@450	t1	0,04813	2,83892E-4
DOD@450	k	20,77617	0,12254
DOD@450	tau	0,03336	1,96779E-4



Model	ExpDec1		
Equation	y = A1*exp(-x/t1) + y0		
Reduced Chi-Sqr	9,44334E-5		
Adj. R-Square	0,68027		
		Value	Standard Error
DOD@450	y0	0	0
DOD@450	A1	-0,10427	4,96901E-4
DOD@450	t1	0,1326	0,00192
DOD@450	k	7,54159	0,10916
DOD@450	tau	0,09191	0,00133